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ANNALS

OF

OTOLOGY, RHINOLOGY

AND

LARYNGOLOGY.

Vol. XXIII. MARCH, 1914. No. 1.

I.

ACUTE THYROIDITIS AS A COMPLICATION OF ACUTE TONSILLITIS.*

By Clement F. Theisen, M. D.,

Albany.

During the past ten years a number of cases of acute thyroiditis, seven in all, have come under the writer's observation. This may not appear to be a large number, but acute thyroiditis is a fairly uncommon and interesting condition, and for that reason a paper on the subject may be timely.

The writer's cases are of particular interest from an etiologic standpoint, as in all except one case the inflammation of the thyroid gland occurred with or directly after attacks of tonsillitis.

Four of the patients have been seen from time to time during a number of years, and the writer's observations are particularly based on these cases. Two of these patients have each had two distinct attacks of acute thyroiditis, each time with an acute tonsillitis, and both have since developed well-marked diffuse goiters.

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*Read before the Medical Society of the State of New York at the Annual Meeting, held at Rochester, April 29 and 30, and May 1, 1913.

In both of these cases, as well as in all of the cases reported in this paper, the inflammation of the thyroid occurred in a previously healthy gland of normal size. For this reason, and because in no case did suppuration occur, the cases belong in the class described by Mygind and other authors under the name "thyroiditis acuta simplex," particularly to distinguish them from cases of acute strumitis in which the disease involves the already hypertrophied thyroid gland.

Suppuration occurs much more frequently in this class of cases, and they are not so uncommon, occurring sometimes with pneumonia, measles, typhoid fever, influenza, diphtheria, etc.

The writer's patients were all girls and young women, and a search of the literature shows that this is true in the majority of the cases. The only case that did not occur with tonsillitis was one that developed during the course of a pneumonia.

A point of particular interest is the fact that two of the patients have since their attacks of acute thyroiditis developed well-marked goiters.

Two others had attacks of hyperthyroidism with all the typical symptoms developing soon after the attacks of acute tonsillitis and thyroiditis.

I do not wish to be understood as emphasizing the above facts as being important etiologic factors in the development of goiter, but it is by no means impossible that the repeated inflammatory attacks the gland was subjected to in the two cases before referred to may have partly at least been responsible for the subsequent chronic hypertrophy of the gland.

S. P. Beebe,[1] in an interesting paper in the *New York State Journal of Medicine,* states that "a considerable number of these patients have tonsils and adenoids, and an acute attack of hyperthyroidism may follow promptly an acute attack of tonsillitis."

He also says that "these patients often give a history of repeated attacks of acute tonsillitis preceding the development of a goiter, and that any acute throat condition should be avoided."

Lücke[24] has given perhaps the best description of acute inflammations of the healthy thyroid gland. He divides them, according to their etiology, into three forms: the idiopathic, traumatic, and metastatic.

A classification of acute suppurative thyroiditis and acute simple thyroiditis is more practical, however, and has been adopted in the writer's paper.

Acute simple thyroiditis which runs its course without suppuration is a rare disease, and a primary acute inflammation of the thyroid gland is declared by Ochsner and Thompson in their classical work, "The Surgery and Pathology of the Thyroid and Parathyroid Glands," to be so rare that it is almost never seen. I have been able, however, to find a few cases in the literature which will be referred to.

I would again emphasize the necessity of distinguishing between the cases of inflammation of a previously hypertrophied gland, strumitis acuta, which is not so uncommon, particularly where goiter is endemic, and the cases of acute inflammation of a previously healthy gland. There is some confusion in the literature in this respect, as several authors have used the terms incorrectly.

Simple acute thyroiditis must also not be confused with acute hyperemia of the thyroid gland, such as is seen in anomalies of menstruation and acute infectious diseases. It is not uncommon in measles epidemics, particularly in Switzerland, where goiter is endemic.

Symptoms.—The symptoms in cases of acute thyroiditis are quite characteristic. A symptom, and one causing the patient perhaps the most discomfort, is the dysphagia which is practically always present. This difficulty in swallowing, which is largely mechanical, due to the compression of the esophagus, is most marked when the swelling of the left lobe of the thyroid is very decided, because the esophagus is closer to the left lobe than to other parts of the thyroid. The dysphagia, as in cases three and four (writer's), is sometimes so great that for several days it is difficult for the patient to swallow even liquids. The writer is, however, of the impression that if some of the cases of acute thyroiditis are carefully studied, it will be found that the dysphagia is partly at least caused by the intense acute angina which often precedes the attack, and will be found more frequently than the reported cases indicate.

Acute thyroiditis is accompanied by a more or less acute congestion and swelling of the mucosa of the upper air passages, and the dyspnea, which is also a frequent symptom, is caused by both the compression of the trachea by the greatly swollen thyroid and the congestion of the tracheal mucous membrane.

A good many of the cases start with a chill, headache, prostration and other symptoms of an acute infectious process. There is always an elevation of temperature, but this is rarely either very high or prolonged, except in the cases that go on to suppuration. The swelling of the thyroid varies, but is usually considerable, and there is sometimes considerable congestion of the surrounding parts.

WRITER'S CASES.

Case 1.—Miss L. B., aged twenty years, came into the Nose and Throat Clinic at St. Peter's Hospital in 1906, with history of sore throat for several days. On examination a typical acute follicular tonsillitis was found. The thyroid gland was greatly and uniformly swollen, with some redness of the skin, and very tender to the touch. This developed during the third day of tonsillitis, and the patient stated that the gland was not enlarged before her attack of tonsillitis. The swelling of the thyroid increased during the next two days, and there was some dyspnea, undoubtedly caused by tracheal compression. Deglutition was very painful, but there was not as much dysphagia as in some of the other cases, perhaps because the left lobe of the gland was not more involved than the other parts.

Temperature was 103° F. for several days. The usual treatment for tonsillitis was given, and an ice coil was kept around the neck constantly until the swelling of the thyroid gland subsided, which was in about a week. The temperature gradually dropped, being normal within a week and remaining so.

Patient would not consent to a tonsillectomy, and the following winter came to the clinic with a similar attack, running the same course and again developing with an acute tonsillitis.

This patient came to the clinic at regular intervals during the next two years, and while there were no further attacks of acute thyroiditis, she developed a gradually increasing diffuse goiter. It is at least possible that etiologically there is a connection between her attacks of thyroiditis and the subsequent hypertrophy of the gland. There is no doubt that the infection of the gland was each time caused by the acute tonsillitis.

The only internal medication that this patient—and in fact all the writer's patients—received was calomel in the beginning of the attack and urotropin in large doses, freely diluted.

Just how much good urotropin did these cases I am not prepared to say. Many good results are reported from its use in acute processes of the upper air passages.

As before stated, none of the writer's cases went on to abscess formation in the gland. The constant use of the ice coil was of the greatest service and reduced the acute congestion of the gland very promptly in all cases.

Case 2.—Young woman, married, age twenty-two years. Same history as in preceding case. Acute thyroiditis developed during an attack of acute tonsillitis, and the development of the attack could again be observed from the beginning. The thyroid was greatly congested and extremely sensitive to pressure. Dysphagia and dyspnea, as in the last case.

Cold applications to neck again reduced the swelling of the thyroid quickly, and this subsided with the improvement of the acute angina, showing an undoubted connection between the two conditions. She was practically well in ten days, and I did not see her again for about two months, when she came to the clinic with typical symptoms of hyperthyroidism.

Cases 3 and 4.—Both young women, ages twenty-one and twenty-four years, respectively, unmarried. Both stated that before the present attack they had had no enlargement of the thyroid.

One patient was just getting over a severe attack of acute tonsillitis, and the other was still having an acute attack. In both patients the thyroid gland was greatly swollen and extremely sensitive to the touch.

The dysphagia in both cases was extreme, so that for several days liquids could be swallowed with great difficulty. There was also great dyspnea for two or three days. The ice bag with the treatment used in the other cases, reduced the inflamed thyroids quickly.

Temperature for four or five days was 103° F., and they were very ill with chills and great prostration.

Case 5.—Mrs. J., aged twenty-five years. I was called to see this patient by her attending physician for a swelling of the thyroid which developed after the crisis of pneumonia. The swelling increased rapidly for several days, and there was the usual great tenderness. The throat was reddened, but there was no history of an acute angina. Her physician stated that her thyroid had been entirely normal before the pneumonia. The attack ran the usual course of about ten days, and yielded to the same treatment.

Case 6.—Miss A. S., aged nineteen years. First seen in January, 1908. Had had a very severe acute tonsillitis a week before I saw her, and developed the acute thyroiditis immediately after the attack.

The attack ran the usual course, and a year later another acute thyroiditis came on with an acute follicular tonsillitis. This patient has been under observation continuously, and had developed a well-marked diffuse goiter, which started about six months after her last attack of thyroiditis.

Case 7.—In the seventh case, that of a woman, aged thirty years, a very severe acute thyroiditis came on directly after an acute tonsillitis. There was a good deal of dyspnea and dysphagia in this case, and within a few months after the attack she developed a typical condition of hyperthyroidism.

Of the cases found in the literature on the subject, I could find only the following references to acute angina, as a cause for acute thyroiditis:

Lewis and O'Neil,[2] who reported severe pharyngitis and great pain in swallowing for two weeks with the attack.

v. Handing's case[12] and Ewald's contribution.[14] Ewald calls attention to the fact that the inflammation of the thyroid may follow inflammatory processes of neighboring parts, and particularly acute sore throat.

Denger[8] and Pieri[5] have described the relation of acute thyroiditis and Graves' disease. Pieri has collected six cases, and Denger has reported seven cases.

PRIMARY CASES.

The primary cases are the rarest of all, and there are only a few in the literature.

The youngest case on record (primary) is that reported by Carpenter,[11] in a boy fourteen months old.

Goldberger,[4] Weber[9] and Burk[7] have also reported primary cases.

The above cases, so far as I could determine, were nonsuppurating cases, and the following are the only other authentic cases belonging in this classification that I could find. In all of them the thyroid had been previously healthy. They have been reported by Cruvelhier,[25] Bauchet,[26] Brieger,[28] Koppe,[27] Barlow,[29] Given,[30] Charrot,[31] Koranyi,[32] and Zesas.[33]

In these cases the ages of the patients, mostly women, were between twenty and thirty years, with the exception of Barlow's case, which occurred in a child three years old.

Mygind's case[23] followed a nasal infection terminating in erysipelas.

Diphtheria was responsible for the inflammation of the thyroid in Brieger's case, typhoid in Koranyi's and malaria in Zesas'.

Of the other cases in the literature, Schwerin[6] has reported two cases of the nonsuppurative type of thyroiditis, and Collet[3] has reported a case with whooping cough in a child eighteen months old. An abscess formed in this case, and it is one of the youngest cases on record.

Sabitt[10] has reported thirteen cases from the Geneva clinic, including one of his own. He states that cases occurring with pneumonia are usually mild. When bacteriologic findings were positive, pneumococci were found in 44.82 per cent of the cases.

Kyle[13] has reported two cases of the thyroiditis simplex type, both in young men aged twenty-four years. He found in both cases changes in the blood, increase in fibrin, and diminished function of the red blood corpuscles.

The following were also found: One reported by Bruney,[16] following pneumonia; one after influenza, reported by Browne,[17] and one by Smeeton[18]; two after influenza by Kiffen[19] and Ismet[22]; and one by Robertson,[20] following diphtheria in which an abscess formed.

Bauer[21] has reported three cases during the course of scarlet fever.

A study of the reported cases shows that in a fairly large percentage the inflammatory attack involved a gland that had been chronically enlarged, also that the majority of the cases occurred with or followed acute diseases such as diphtheria, scarlet fever, influenza, pneumonia, etc. Exclusive of the writer's cases, there were only a few cases reported as a result of tonsillitis.

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II.

THE DIAGNOSIS OF ENDOCRANIAL COMPLICATIONS OF SUPPURATIVE LABYRINTHITIS.

By Alfred Braun, M. D., and Isidore Friesner, M. D.,

New York.

As a result of the greater attention which otologists in recent years have paid the labyrinth, there has developed an increasing appreciation of labyrinthine infection as a cause of intracranial complications. Unquestionably, suppurative disease in the labyrinth is one of the most prolific sources of otitic intracranial infections, particularly those that affect the structures in the posterior fossa of the skull.

That the labyrinth should so frequently act as the conveyor of a middle ear infection to the cranial contents is not astonishing when we consider the intimate relationship between the labyrinthine capsule and the middle ear spaces on the one hand, and the avenues of communication between endolabyrinthine and endocranial spaces on the other.

The promontory, the oval and round windows, and the cupola of the external semicircular canal lie exposed in the middle ear and aditus. The superior semicircular canal is almost in direct contact with the dura of the middle fossa, while the posterior semicircular canal is often very close to the cerebellar dura.

The endolymph spaces in the labyrinth are in direct communication with the subarachnoid space through the lymph channels in the sheath of the eighth nerve as the latter passes through the internal auditory canal to the cerebellopontine angle. The perilymph spaces of the labyrinth communicate directly with the subarachnoid space through the aqueductus cochleæ. From the saccule and utricle a fine tube (the ductus endolymphaticus) leads to the posterior surface of the petrosa, where it emerges midway between the internal auditory meatus and the lateral sinus. Here is broadens into the saccus endolymphaticus, a bag-like structure which lies between the layers of the cerebellar dura, often extending out as far as the wall of the lateral sinus.

Intracranial complications occur with both acute and chronic labyrinthine suppuration. They are, however, relatively more common with acute labyrinthitis because there is no time for the inflammatory process in the labyrinth to be walled off. On account of the overwhelming predominance of chronic over acute suppurative labyrinthitis, intracranial complications are really more frequently observed associated with the chronic form.

Endocranial infections that originate in the labyrinth may extend from the latter through various paths. They may travel through preformed avenues of communication, such as the aqueductus cochleæ or the lymph spaces surrounding the nerve. Such an extension results usually in rapidly spreading meningitic processes. Meningitis is the most common form of endocranial infection complicating suppurative labyrinthitis. Not infrequently, however, even when the infection progresses through the lymph channels along the eighth nerve, there occurs a collection of pus localized in the internal auditory canal. This condition occurs particularly with chronic suppurative labyrinthitis. The abscess owes its limitation to the arrangement of the sheaths of eighth nerve in the canal. The arachnoid sheath leaves the nerve some distance from the fundus of the canal and applies itself to the dural lining of the bony walls at the area cribrosa, thus closing off a funnel-shaped space at the fundus, separate from the inner portion of the canal. In this space an abscess may remain localized until the arachnoid barrier is broken down. Then the infection spreads to the intracranial cavity.

Labyrinthine infection may spread to the endocranium through the ductus and saccus endolymphaticus, or by necrosis of the posterior or superior semicircular canal. The infective process which reaches the endocranium by one of these routes is usually localized, as the spread of the infection to the cranial cavity is necessarily very slow. Necrosis of the posterior semicircular canal results in disease of the posterior fossa and necrosis of the superior canal in disease of the middle fossa.

The saccus endolymphaticus lies between two layers of the dura, just anterior to the lateral sinus. An abscess in the saccus may extend backward until it comes to lie in the inner wall of the lateral sinus, and may thus give rise to an infective process within the sinus.

The labyrinthine veins empty into the inferior petrosal sinus. Through these veins a labyrinthine infection may extend into the inferior petrosal sinus, and may spread backward to the bulb and lateral sinus, or forward into the cavernous sinus.

Endocranial complications of suppurative labyrinthitis usually occur in the posterior fossa, rarely in the middle fossa. They are:

1. Extradural abscess.
2. Interdural abscess (saccus empyema).
3. Subdural abscess.
4. Cerebellar abscess (rarely temporosphenoidal abscess).
5. Meningitis: 1, circumscribed; 2, diffuse; (a) serous; (b) purulent.
6. Thrombosis of dural sinuses (most commonly lateral sinus; occasionally extension through petrosal to cavernous sinus).

Some symptoms are common to all forms of infective processes in the posterior cranial fossa. Oftentimes these forms cannot be differentiated one from the other, and we must content ourselves with the tentative diagnosis of an infective process in the posterior cranial fossa, until operation or autopsy shows the particular form of involvement.

Intracranial extension of a labyrinthitis occurs only, as a rule, after the endolabyrinthine spaces have been involved in a diffuse suppurative process. It is almost unknown with serous or circumscribed labyrinthitis. Consequently we find upon examination, in most of the cases of intracranial complication of labyrinthine disease, complete loss of labyrinthine function, that is, total deafness, negative caloric and fistula tests, and on rotation, signs of destruction of one labyrinth, either recent or of long standing.

Rarely, in the cases which complicate acute labyrinthitis, the labyrinthine functions may not yet have been entirely destroyed when the endocranial complication has begun. In these cases it will still be possible to arouse the labyrinth by some form of stimulation.

Signs of manifest labyrinthitis are not often seen with intracranial complications, with the exception of meningitis complicating an acute suppurative labyrinthitis. Without doubt there have been many instances in which the labyrinthine symptoms were confused with the early meningitic symptoms. Indeed, these symptoms are often so intermingled that there is considerable difficulty in differentiating between them. The symptoms of labyrinthitis occur only at the beginning of the acute cases and day by day become less severe. Several weeks after the onset of an acute labyrinthitis there are no longer any manifest symptoms present, nor are they to be found in those cases where the endocranial condition complicates a chronic labyrinthitis. In many of the cases, however, if the previous history is gone into carefully, one or more attacks of dizziness, with or without vomiting, will be recalled. In some cases a typical history of an attack of labyrinthitis, lasting one or two weeks, will be brought out. Occasionally, too, inquiry with regard to hearing will elicit the fact that hearing was suddenly lost; or, on the other hand, the patient may state that he does not recall when he had hearing in the affected ear.

Symptoms of disease in the posterior cranial fossa closely resemble those of disease of the labyrinth itself, because the former are due to irritation of the labyrinthine centers. Cases of meningitis and cerebellar disease have often been mistaken for labyrinthitis.

Where the labyrinthine functions have been impaired but not entirely destroyed, it is very difficult to differentiate between labyrinthine disease alone and labyrinthine disease complicated by disease in the posterior fossa. Where the labyrinthine functions have been totally destroyed, as occurs in the majority of cases, the existing symptoms can, of course, be easily ascribed to the complicating intracranial lesion. In the former cases we must call other symptoms to our assistance.

Among these are temperature and headache, which practically never occur with an uncomplicated labyrinthitis. The symptom of enduring caloric nystagmus, as described by Neumann, is of value here, especially with cerebellar abscess, but it may also be elicited when there is pressure on the cerebellum from extra- or subdural collections of pus. If in cerebellar disease cold water be allowed to flow into the sound ear, it will cause a nystagmus to the opposite side, lasting five or ten minutes. The cerebellar cortex exercises an inhibitory influence over the vestibular centers, just as the cerebral cortex exercises an inhibitory control over the spinal motor centers. Disease in the cerebellar cortex results in loss of this inhibition of the vestibular centers, with the result that when the latter are aroused by the stimulus produced by cold water in the ear, the resulting response, namely the nystagmus, is very violent and lasts a long time.

The nystagmus which accompanies disease in the posterior fossa differs in nowise from that due to labyrinthine disease. It is of the same type as nystagmus of labyrinthine origin and occurs in the same planes. In the advanced stages there are disturbances of consciousness, and signs indicative of meningitis.

Let us, for the sake of clearness, assume some concrete cases. We have a patient who complains of vertigo and deafness. On examination we find that he has a spontaneous nystagmus to the right. His right ear is in a condition of chronic suppuration. His left ear is normal. He is completely deaf in the right ear, and his static labyrinth on that side is unirritable. Without any further examination we can make a diagnosis of disease in the posterior cranial fossa, for a dead labyrinth cannot cause a nystagmus toward its own side.

If, however, we find some hearing in the right ear and a positive caloric reaction, we must look for further data to help us in our diagnosis. The duration of the symptoms is of assistance to us. If the symptoms have been continuous and have lasted more than two or three weeks, we are probably dealing with endocranial disease, for the symptoms of a circumscribed labyrinthitis are intermittent, and those of a diffuse labyrinthitis improve after the first few days and, excepting the nystagmus, have usually completely disappeared after ten days or two weeks. Symptoms of endocranial disease, on the other hand, either remain constant or become progressively worse. In cases where we are in doubt, Neumann advises doing a labyrinth operation. If the nystagmus toward the affected ear persists after the extirpation of the labyrinth, we are unquestionably dealing with endocranial disease.

During the radical mastoid or labyrinth operation we may find a condition which will lead us to explore the posterior fossa, such as a fistula in the dura or a very much discolored dura. But we can very well have an intracranial suppuration with a macroscopically normal inner table and dura. The condition of the labyrinth itself as disclosed intraoperatively may sometimes help us in determining to explore the posterior fossa. If, in the presence of symptoms suggesting endocranial complications, we find at operation an eroded labyrinthine capsule and the endolabyrinthine spaces filled with granulations, our suspicion of disease in the posterior fossa would be very much strengthened.

The presence of headache, especially if it be persistent and localized, is suggestive of endocranial involvement, for labyrinthine suppuration, in itself, does not cause pain. We must, of course, exclude pain due to disease of the mastoid. The location of the pain is no guide as to the location of the intracranial disease. We may have frontal pain with disease in the cerebellum. The pain varies from an occasional slight feeling of discomfort to a constant agonizing pain which even morphin will not relieve, and which causes the patient to toss from side to side and to moan in anguish.

Often it is possible to elicit a point of tenderness to percussion on the skull. In some cases the pain is referred to a localized area, irrespective of what portion of the skull is percussed. We have never, however, been able to assure ourselves of the change in the percussion note over a brain abscess as described by Macewen.

The presence of temperature for which no other cause can be determined also points to intracranial disease. The same may be said of a high leucocyte count. A peculiar beating tinnitus in the affected ear is often complained of in disease of the posterior fossa. This is all the more striking when the functional tests disclose the fact that hearing has been totally destroyed.

In every suspicious case lumbar puncture should be done. A turbid cerebrospinal fluid will, of course, give us positive information, but a negative fluid does not exclude endocranial disease. A sterile turbid fluid seems to be characteristic of brain abscess. This condition was found in two cases observed by the writers, and in many cases reported in the literature. Turbidity does not necessarily mean a diffuse meningitis.

Optic neuritis does not occur in uncomplicated labyrinthitis, but it is absent in many cases of brain abscess and meningitis. Stupor, delirium, rigidity of the neck, Kernig's sign, etc., leave us in no doubt as to the diagnosis.

The direction of the falling, or the tendency to fall, helps us sometimes. With uncomplicated labyrinthitis the falling is always in the direction of the slow component of the nystagmus, and is definitely influenced by changes in the position of the head. In endocranial disease the direction of the falling follows no rigid rules; although in cerebellar abscess there is usually a tendency to fall toward the diseased side, irrespective of the direction of the nystagmus, if this be present.

Bárány's pointing tests are often of considerable assistance in making a diagnosis. With disease in the right cerebellar hemisphere there is a spontaneous pointing-by to the right of the right arm, forearm or hand, irrespective of the direction of the spontaneous nysgtamus. If an artificial horizontal nystagmus to the right is produced by rotation or cold water, the right arm, forearm or hand will not point-by to the left, as would be the case if the cerebellum were normal.

Sometimes the patient is unconscious when first seen. In this condition a nystagmus is represented by a conjugate deviation of the eyes in the direction of the slow component of the nystagmus. If an unconscious patient has a deviation of the eyes to the right, and a chronic suppurating ear on the left side, and cold water allowed to flow into this ear does not change the position of the eyes, he probably has a cerebellar abscess of labyrinthine origin. If cold water brings the eyes over to the left, the endocranial condition is not labyrinthogenic.

The symptoms which are common to all forms of inflammatory processes in the posterior fossa are headache, vomiting, and vertigo. Temperature elevation is also common to all except cerebellar abscess.

Extradural abscess may occur without any symptoms outside of those of the labyrinthitis. It is often found accidentally in the course of a labyrinth operation. This is one of the arguments in favor of the Neumann operation, as here, since the cerebellar dura is exposed, we may find an epidural abscess which would otherwise remain undiscovered.

Interdural abscess is usually due to saccus empyema, and can be positively diagnosticated, according to Kramm, only when the pus works its way backward between the two layers of the dura until it lies between the lateral sinus and cerebellum, and then infects both of these structures. A combination of the symptoms of suppurative labyrinthitis, sinus thrombosis and cerebellar abscess usually means a saccus empyema.

Subdural abscess gives symptoms similar to those of cerebellar abscess.

In cerebellar abscess there is usually little or no temperature. It may even be subnormal. The pulse is apt to be slow—fifty to sixty. Rapid and extreme emaciation is very common, and the vomiting is usually more persistent than in abscesses affecting the cerebrum. There may be optic neuritis. There is apt to be a sterile turbid cerebrospinal fluid under pressure. There may be a spontaneous pointing-by in an outward direction of the arm, forearm or hand on the affected side, and on arousing a nystagmus toward this side there will be no pointing-by inward—i. e., toward the other side. There may be a hemiparesis of the affected side or a disturbance of joint and posture sense. There may be adiadokokinesis—i. e., an inability to execute rapidly successive volitional movements.

The symptoms of meningitis are too familiar to all to require enumeration here.

The symptoms of sinus thrombosis are irregular fever with marked remissions, chills and sweats, bacteremia, and perhaps evidences of metastatic abscesses. With involvement of the cavernous sinus there are, in addition to these symptoms, edema of the lids and conjunctiva, proptosis of the eyeball, strabismus, and dilatation of the pupil. With cavernous sinus thrombosis the blood culture is usually negative.

Occasionally, labyrinthine suppuration gives rise to endocranial disease as a result of perforation through the superior semicircular canal. When this occurs the symptoms will, of course, be those of disease in the middle fossa.

III.

A REPORT OF THE RESULTS OF SEVEN CASES OPERATED UPON BY MR. HEATH.*

BY

Edward M. Plummer, M. D., and Harris P. Mosher, M. D.,

Boston.

INTRODUCTION.

A week before the Ninth International Otological Congress held in Boston in August, 1912, Mr. Charles Heath of London was given the freedom of the Aural Department of the Massachusetts Charitable Eye and Ear Infirmary. This was done through the courtesy of the board of trustees and of the surgeons then on duty. Mr. Heath was given his choice of cases, and selected seven upon which he operated with his own instruments and with the help of his own assistant. He did the dressings and directed all the treatments during his stay, that is, for about two weeks. During this time he was most gracious and painstaking in instructing the surgeons on duty and the house staff in his method of operating and in his mode of after-treatment. At his departure, he left at the hospital a set of instruments for carrying out the after-treatment and the formulæ of the solutions used for this purpose. During the remainder of August, and for the whole of September and October, in other words, for the rest of the service, Mr. Heath's cases were supervised and dressed by Dr. Plummer and Dr. Mosher, occasionally by the senior house officer, Dr. MacMillan, who was second assistant at the operations and had followed the cases from the start. When the cases were discharged from the house, and they were not discharged until the end of the service, they came under the care of the assistant surgeon in the Out-Patient Department. At first, Mr. Heath's method of after-treatment was followed rigidly. When certain cases failed to respond to this, the usual after-treatment of the hospital was substituted. What this was can be found in the detailed history of the cases. On April 26, of this year, roughly seven months after the operations, a letter was sent to all of the patients, asking them to report for a final examination. Four of the cases reported, one was out of town and will report later; two cases could not be located.

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*Read before the American Otological Society, Washington, 1913.

The subject of this paper is the results obtained by Mr. Heath in the seven cases which he operated. The steps of his operation and his method of performing them are in print and will not be discussed. Further the paper does not deal with his reasons for considering the cases operable. A little is added, however, on the progress of the cases during healing. The writers of this report are in a position of considerable delicacy. They are reporting the results of the work of a guest; a guest who did not have the opportunity of following his cases and who cannot be present at the discussion of them. He was untiring in demonstrating and explaining the cases to us, and then left them manfully and unreservedly in our hands. They are reported without obtaining his formal consent. The report, of course, will be sent to him. Any man can see that a spirit of fairness is necessary on both sides. There was a tacit understanding, that Mr. Heath wished a fresh and a candid and impartial consideration of his work. He paid us the compliment to come to this country for it. We have tried to give it. The writers hope that the bitter personalities which characterized the debate on Mr. Heath's work last August will not be repeated.

The report is made up as follows: The detailed histories of the cases just as they stand in the hospital records are first given, abbreviations and all, without change. This part will be skipped in the spoken paper. The reader will do well to take this part of the paper last. After the detailed histories a short summary of each case is presented. The writers comment on each case, and then summarize the abstracts. The last few paragraphs give some of the impressions which the writers of the report gained from watching Mr. Heath operate and from following the cases afterwards. The detailed histories of the cases follow:

PART I.

Vol. 34, page 301. Margaret Donovan. Age 6. Residence, 21 Carson street, Dorchester, Mass. Birthplace, Massachusetts. August 12, 1912. Reentry Jan. 19, 1912. Vol. 33.

Diagnosis: A. S. o. m. s. a. A. D. o. m. s. a. Recurrent mastoiditis—postaural abscess.

Operation: Heath conservative mastoid. Mr. Heath.

History: A. D. patient was admitted to this hospital Jan. 19, 1912, suffering from A. S. o. m. s. a. A. D. mastoiditis with postaural abscess. A mastoid operation was done by Dr. Lothrop, in which the abscess was incised and the cortex found perforated near canal. Cortex removed and all softened cells curetted out. Antrum found and curetted. Sinus exposed but not opened. Discharged on Feb. 1, 1912. A. D. well until last Monday (one week ago), when pain commenced and has lasted to date. There has been discharge for the past three days. Mastoid tenderness has existed for four days, and swelling for three days. P. E. negative.

Examination: A. D. mastoid scar of previous operation. Marked postaural redness, bulging and fluctuation. Small round perforation in lower part of M. T. Very profuse purulent discharge. A. S. M. T. red and bulging. No landmarks seen. Under primary ether M. T. incised.

Aug. 13. Operation. Ether. Mr. Heath. Usual Heath incision. Pericranial flap cut. About one-half ounce of pus escaped from under periosteum. Small pinhead perforation found in reformed lateral wall of mastoid. Antrum exposed from front and posterior canal wall removed. Antrum burred out and meatal flap cut and M. T. exposed. Perforation in posterior half of drum. Two flaps sutured together. Dressing to antrum and meatus. Usual cut made through helix and tube inserted. Wound closed with seven s. w. g. sutures. Moist dressing. Bandage.

Aug. 14. Sutures removed. Moist dressing reapplied.

Aug. 19. Wound dressed daily by Mr. Heath, who has changed the tympanic and antral dressing daily.

Aug. 25. Incision firmly healed behind. Incision through crus of helix gaping and granulating. Considerable mucus about tube still. Antrum granulated and full. Exuberant granulations on bridge and on post. sup. segment of M. T. Single gauze wick to M. T. Superior wall of meatus projecting. Tube left out and gauze plug inserted instead.

Aug. 29. Skin incision firmly healed. Scar of first operation slightly elevated. Incision of present operation scarcely visible. Incision through helix healed without deformity. Wick well saturated with pus. Antrum granulated full. Flap in place. Pus in M. E. . Large granulations over upper anterior border of bridge, hiding most of M. T.

Sept. 6. Moderate amount of secretion on wick. Antrum closed. M. T. ⅔ seen. Moderate mucopurulent secretion coming from M. E.

Sept. 18. Small area of granulation on bridge removed. Discharge continues.

Sept. 28. Discharge from M. E. has stopped.

Oct. 3. After remaining dry for two days discharge noticed again, but only slight amount.

Oct. 7. No discharge from M. E. since last note.

Oct. 10. Discharged relieved to O. P. D.

Vol. 34, page 258. Name, Joseph Weinstein. Age, 21. Occupation, factory operator. Birthplace, Russia. Residence, Eastman House, Revere, Mass. July 29, 1912.

Diagnosis: A. D. o. m. s. a. Mastoiditis.

Operation: Heath mastoid operation. Mr. Heath.

History: A. D. patient had a "head cold" three weeks ago, following which A. D. pained for one day and was lanced by Dr. Myers of Chambers street. A. D. has discharged since and patient has syringed it. Pain stopped until two days ago, when it became very severe at intervals. He has had occasional headaches. Mastoid tenderness two days. P. E. negative. Urine negative.

Examination: Considerable tenderness over tip and antrum. No postaural redness. Very profuse purulent discharge from M. T. Large irregular perforation in posterior lower quadrant. Considerable edema of superior canal wall.

Aug. 3. Operation. Ether. Mr. Heath. Incision made at junction of attachment of auricle posteriorly. Pericranium exposed and temporal muscle. Pericranial flap cut and held back, cortex exposed. Antrum exposed from the front, cortex being removed along anterior part of bony canal.

Antrum burred out. Meatal flap cut and M. T. exposed. Perforation found at lower posterior quadrant. Posterior canal wall previously having been taken down to within ⅛ inch of M. T. Flaps trimmed and sutured with one C. G. suture. Canal incised through helix. Dressing to antrum and tympanum. Tube fitted and inserted into canal. Wound closed with 7 s. w. g. sutures. Moist dressing. Bandage. Lotion washed out many small white flakes, said to be cholesteatoma. (Mr. Heath.) Air forced from antrum through perforation in M. T.

Aug. 4. Sutures removed. Moist dressing reapplied. No temperature. No headache.

Aug. 5. Tube removed from meatus. Dressing removed from antrum. Dressing very painful. Plug left in meatus. Moist dressing reapplied.

Aug. 6. Under gas plug removed from antrum. Antrum wiped with iodoform emulsion and small dressing reapplied to antrum and tympanum.

Aug. 7. Tube changed. Antrum and tympanum redressed with plugs wet with iodoform emulsion. Air blown through perforation by Valsalva's method.

Aug. 10. Temperature up to 103°. Headache for three days. Mastoid wound well healed.

Aug. 14. Up and about. Dressed and tube changed every day since operation.

Aug. 19. Incision fully healed. No induration of wound. Temperature 99°. Headache during P. M., beginning at 4 P. M. for several days. No pain in ear. Slight discharge. Incision through crus of helix ¾ healed. Slight granulation in lower part. Considerable discharge from meatus. Few granulations on upper meatal wall along edge of flap. Perforation patent by Valsalva. Tag of flap on upper wall.

Aug. 22. Profuse amount of discharge from M. E. Incision through helix healed. Tag of flap on superior wall still. Antrum ½ obliterated. Bridge covered with granulations. Valsalva successful. Pus blown from M. E.

Aug. 26. Considerable amount of granulations from incision through helix, these were trimmed and cauterized with Ag No_3 stick. Antrum well filled in. M. E. still discharges freely. Valsalva shows patent perforation and semi-purulent discharge blown through.

Aug. 30. Incision through crus of helix slightly gaping inferiorly, otherwise healed. Moderate amount of discharge from canal. Valsalva successful, expelling pus from M. E. Antrum granulated full. Grans. on anterior surface of bridge and covering in places the M. T. Slight tag of flap in middle of superior wall. Gauze wick saturated with zinc. sulph. to M. T. Tube reapplied.

Sept. 6. Tube still in. Much foul discharge about tube. Incision through crus of helix healed without deformity. Much pus in canal and about M. T. Slight dimpling at site of antrum. Flap well back and in place. No tags. Thin pus blown from M. E. Posterior half of M. T. seen. Tube out, gauze wick to canal.

Sept. 27. Tag of flap posteriorly superiorly. Canal filled with aristol. Two days ago patient developed cervical adenitis on right side of neck. ℞ Hot sulphonaphthol poultices.

Oct. 4. Neck continues to be painful. Swelling less. Discharge, however, continues from M. E., but now only slight amount.

Oct. 10. Ether. Operation. Dr. MacMillan. Right tonsil removed in usual way. No point of infection found. Left tonsil not touched, as patient did very poorly under ether and tonsil presented no indication for removal.

Oct. 16. Since removal of tonsil adenitis has improved, but ear still discharges a small amount of pus daily.

Oct. 21. Adenitis well. M. E. still slightly moist. Two-thirds of M. T. visible. Antrum well epidermatized. Small round perforation in lower posterior quadrant. Discharged relieved to O. P. D.

Dec. 30, 1912. A. D. M. T. of normal appearance; landmarks seen; antrum well epidermatized over. Ear dry.

August 1, 1912.

R					L
18					18
—		W			—
25					25
—		V			—
8		AC		25″	15
—	F 512 V. S.	—	—	—	—
10		BC		12″	10
	WEBER < F 256 V. S.				
N	LIMITS GALTON				N
128 V. S.		LOW			V. S. 80

September 21, 1912.

R					L
15					18
—		W			—
25					25
—		V			—
12		AC		25″	21
—	F 512 V. S.	——	—	——	—
14		BC		12″	12
		WEBER < F 256 V. S.			
N		LIMITS GALTON			N
128 V. S.		LOW			V. S. 80

October 21, 1912.

R					L
18					18
—		W			—
25					25
—		V			—
25		AC		25″	22
—	F 512 V. S.	——	—	——	—
14		BC		12″	18
		WEBER < F 256 V. S.			
N		LIMITS GALTON			N
80 V. S.		LOW			V. S. 80

Vol. 34, page 273. Frank Sapanari. Age, 30. Birthplace, Italy. Residence, Attleboro, Mass. Laborer.

August 31, 1912.

Diagnosis: A. D. o. m. s. a.

Operation: Heath conservative mastoid.

History: A. D. Two months ago the patient had pain below the right auricle. It soon went away and one month ago he felt the ear blocked up. He came to O. P. D. and had cerumen syringed out of both ears. At that time he had otitis externa diffusa in A. D., and on July 2nd, 1912, canal was incised in O. P. D. Ear commenced to discharge 6 days ago, and mastoid became tender 5 days ago and has been so since. P. E. negative.

Examination: A. D. external canal filled with polyp. Purulent discharge from M. E. No part of M. T. can be seen. Marked mastoid tenderness over antrum, tip and emissary.

Aug. 4. Under gas polyp was removed from A. D. to give better drainage.

Aug. 8. Patient examined today by Dr. Emerson with nasopharyngoscope. Sharp spur on right side of septum in contact with turbinates. Large posterior ends. Vault congested especially on right.

Aug. 9. Operation. Ether. Mr. Heath. Usual Heath incision, etc.

Aug. 10. Sutures removed. Dressing reapplied.

Aug. 15. Patient has been dressed daily by Mr. Heath, who has changed tube and antrum and tympanic dressing and applied iodoform emulsion daily.

Aug. 20. Middle ⅓ of incision not quite healed. Granulation trimmed at this point. One c. m. of incision at upper extremity healed.

Sept. 6. Incision through crus of helix completely healed. Slight redundancy of tissue with slight eversion of posterior lip. Flap boggy. Antrum half granulated in. Considerable pus in M. E. Valsalva successful. Pus expelled. Antrum one-half obliterated. One-fourth of lower posterior part of M. T. seen. Zinc sulph. continued.

Sept. 27. Canal narrowed slightly externally. Superior ridge of flap projects. Opening into antrum 2 m. m. in diameter showing pulsating discharge from M. E. M. E. hard to distinguish. Profuse purulent discharge until last three days. ℞ Sol. M. 2 i. d. Ag No$_3$ bead to granulations.

Oct. 10. For past few days discharge from M. E. has been less than before. Antrum, however, has failed to fill in.

Oct. 18. Only slight discharge from M. T.

Oct. 25. Slight moisture continues from M. E. Antrum not filled in.

Oct. 29. For past few days practically no discharge from M. E.

Nov. 1. Discharged, relieved to O. P. D.

Patient has been seen from time to time in the O. P. D. (by A. L. M.). Last seen on Dec. 20th, when M. E. was dry and considerable part of antrum filled in. M. T. seen but no perforation noted. Landmarks made out. H. T. 18/25; Rinné 14/9; low limit 96.

August 3, 1912.

R				L
$^{1}/_{6}$				18
—		W		—
25				25
—		V		—
5		AC	25″	10
—	F 512 v. s.	— —	—	—
11		BC	12″	15
	WEBER < F 256 v. s.			
N		LIMITS GALTON		N
128 v. s.		LOW		v. s. 80

Vol. 34, page 305. Louis Kaplan. Age 2. Residence, 161 Union street, Rockland. Aug. 14, 1912.

Diagnosis: A. S. o. m. s. a. Mastoiditis. Postaural abscess.

Operation: Heath conservative mastoid.

History: Patient has had discharge from A. S. for past ten days. Swelling developed over mastoid region six days ago. P. E. negative.

Examination: A. S. Postaural redness, edema, and tenderness. Well localized postaural abscess. M. T. red and bulging posteriorly. No perforation seen. Considerable purulent discharge from M. E.

Aug. 15. Operation. Ether. Mr. Heath. Usual Heath incision, etc.

Aug. 19. Up to today, wound has been dressed daily by Mr. Heath. Sutures removed day after operation, since then antrum and tympanic plug changed daily. Moist dressing used.

Aug. 25. Antrum filled with granulations. Gauze wick to M. T. Owing to gaping of canal wound no wick inserted.

Aug. 30. Skin incision healed. Incision through helix gaping. Much discharge. Edge of canal flap projecting. Antrum granulated full. Flap boggy throughout, hiding M. T. Gauze wick to meatus.

Sept. 6. Incision through crus of helix healed with 2 m. m. separation of edges. Much pus from canal. Flap projecting into canal posteriorly readily pushed back, and large granulation seen at tip of flap projecting forward, hiding antrum and M. E. Granulation removed from tip of flap.

Sept. 20. Flap has been touched up daily with $Ag\ No_3$ bead and now able to see M. E. Discharge less.

Oct. 1. Canal now free with only slight projection of flap. Very little discharge from M. E.

Oct. 5. Profuse discharge continues from M. E.

Oct. 16. Discharge as at last note. Today at lower half of mastoid incision there is considerable redness with slight purulent discharge.

Oct. 21. Posterior wound has quieted down. Only slight discharge from wound. Discharge continues from M. E.

Oct. 29. Discharge still continues.

Oct. 30. Middle ear discharge continues and condition of mastoid remains the same.

Nov. 5. Reinfection of mastoid wound fails to respond to treatment.

Nov. 9. M. E. still discharging. Bleeds easily. Few granulations seen. Scharlach red to M. E. Mastoid wound unhealed yet.

Nov. 12. Mastoid wound and middle ear still discharging a good deal. ℞ Tinct. iodin to both.

Nov. 14. Amount of Scharlach red reduced. Mastoid wound red and tender. M. E. still discharges.

Nov. 16. Tinct. iodin to mastoid and middle ear. Both discharging a good deal.

Nov. 20. Wound back of ear discharges less, but fails to heal. M. E. discharges a good deal still.

Nov. 24. Wound over mastoid still fails to heal and middle ear discharges yet.

Nov. 27. Condition the same.

Dec. 2. Posterior wound healing a little. M. E. discharging a good deal yet.

Dec. 5. Operation. Ether. Dr. Jack. Incision made close to auricle to include old incision. Periosteum reflected. Small mastoid cavity found below leading to antrum. Cavity enlarged and curetted. Antrum and M. E. cleaned of granulations. Malleus removed. Eustachian tube curetted. Cavity smoothed out, and posterior canal wall removed to facial ridge. Small graft cut from right thigh and placed within cavity, being held in place by mild indoform tape. Wounds closed with 5 s. w. g. sutures. (Flap was cut from posterior canal wall).

Dec. 7. Patient's temperature has been up since operation, but he appears to be bright and does not complain.

Dec. 10. Dressing changed. Considerable discharge from M. E. and mastoid. Stitches removed, as they had sloughed. Temperature still up, somewhat elevated. Leg was dressed yesterday, is doing well.

Dec. 12. Patient's temperature is still up a little. Posterior wound failed to heal over, and packing projects through it. There is considerable discharge, causing some excoriations of the auricle.

Dec. 14. Packing removed from middle ear. Posterior wound open for about 3 c. m. and gaping. Both M. E. and mastoid wound discharge profusely. Cavity filled with granulations. Evidently graft has not taken.

Dec. 20. Radical cavity dressed daily. Evidently more of graft took. Cavity is covered with granulations and considerable discharge persists from cavity and posterior wound, which is gaping for about 3 c. m. Cavity painted daily with scarlet red 4% in oil.

Dec. 26. Cavity cleaner and wound posteriorly is slowly closing in. Cavity is beginning to show considerable area of epidermatization, especially posteriorly.

Dec. 31. Posterior wound slowly closing in. Considerable discharge continues from cavity. Daily dressings continued. Boric powder in large amounts is now being used.

Jan. 4. Wound slowly improving. Daily dressing with boric powder continued. Considerable area of radical cavity has now epidermatized over.

Jan. 10. Mastoid wound still open and discharge quite abundant. Cavity is epidermatizing and there are not any grans. to be seen. ℞ Pulv. boric.

Jan. 16. Less discharge from mastoid wound, which is closing up slowly. M. E. still discharges a good deal.

Jan. 18. Discharged improved to O. P. D.

Vol. 34, page 224. Name, Russell Noyes. Age, 12. Birthplace, New Hampshire. Residence, 35 Fifth street, East Cambridge, Mass. July 19, 1912.

Diagnosis: A. S. o. m. s. ch.

Operation: Heath conservative mastoid. Mr. Heath.

History: A. S. patient has had discharge from A. S., about once a year with pain at times, and deafness for the past six years. P. E. negative. Urine negative.

Examination: A. S. large perforation involving posterior half of M. T. Incostapedial joint exposed and covered with granulation tissue. Considerable purulent discharge. A. D. M. T. atrophic.

July 29. Under local treatment ear has shown no signs of improvement. Seen by Dr. Knowles, who advises patient to wait for Mr. Heath.

Aug. 12. Operation. Ether. Mr. Heath. Usual Heath incision. Pericranium exposed and flap cut. Flap held back with clip and cortex exposed. Cortex removed at junction of mastoid wall and bony canal and antrum exposed from front. Posterior canal removed down to annulus and M. T.

exposed, showing large perforation in posterior half. Antrum well cleaned out with burr. Dressing to antrum and tympanum. Wound closed by 7 s. w. g. sutures. Large tube inserted through incised helix—moist dressing—bandage.

Aug. 13. Sutures removed. Dressing changed.

Aug. 18. Wound has been dressed daily by Mr. Heath, who has changed antral and tympanic dressing daily, and tube.

Aug. 20. Gauze stained moderately with pyocyaneus. Incision firmly healed in upper half, not quite firm in lower half. Small area of granulations in middle. Abundant purulent discharge around tube. Incision through crus of helix slightly gaping and not healed. Some loss of substance about incision in helix. Antrum, bridge and posterior third of M. T. easily seen. Valsalva not successful. Bridge bare of granulations.

Aug. 22. Antrum one-third filled with granulations. Bridge two-thirds covered. Incision not healed. Flap in good position. Cotton plug of iodoform emulsion to antrum. Gauze wick to M. T.

Aug. 28. Upper two-thirds of incision firmly healed. Lower third slightly gaping. Very little discharge about tube. Incision through crus of helix healed. No deformity. Superior border of flap slightly projecting along median line of superior wall. Antrum one-third obliterated. Valsalva negative. M. T. hidden by granulations from bridge. Bridge covered with granulations. Gauze wick with zinc sulph. to M. T. Wick to antrum.

Sept. 6. Incision practically healed. Incision through crus of helix firmly healed with dimple at upper end. No noticeable deformity. Gauze wick moderately stained. Flap firmly united posteriorly and superiorly. Large granulation over bridge hiding antrum. M. T. not seen. Valsalva negative. Granulation removed from bridge. Antrum then found to be filled with soft granulations.

Sept. 27. Antrum granulated in and ready to epidermatize. Seropurulent discharge from M. E. Anterior half of M. T. red and boggy. Scarlet red to cavity and Sol. M. t. i. d.

Oct. 1. Condition of ear about the same as at last note.

Oct. 13. Today only slight moisture from M. E. Granulation over bridge touched with Ag No_3 bead.

Oct. 19. Antrum closed except for small area about 4 mm. in diameter and of same depth. Very slight moisture in M. E. Posterior half of M. T. seen and rest covered with granulation tissue.

Oct. 21. Discharged relieved to O. P. D.

Dec. 28, 1912. Considerable discharge—slight moisture in antrum, but antrum well epidermatized.

December 28, 1912.

R					L
18					15
—		W			—
25					25
—		V			—
36		AC		25″	17
—	F 512 V. S.	—	—	—	—
21		BC		12″	14
		WEBER < F 256 V. S.			
N		LIMITS GALTON			N
96 V. S.		LOW			V. S. 96

Vol. 34, page 275. Name, Murphy, Daniel. Age, 13. Birthplace, Cambridge. Residence, 21 Frank street, Cambridge, Mass. Aug. 5, 1913.

Diagnosis: A. S. eff. o. m. s. Acute exacerbation.

Operation: Heath conservative mastoid. Mr. Heath.

History: A. S. patient has had discharge from A. S. at times since infancy. Three weeks ago pain started. Mastoid tenderness developed this A. M., but there is no swelling. History of similar attack one year ago. P. E. negative. Urine negative.

Examination: Profuse purulent discharge from M. E. M. T. red, but not bulging. Small round perforation in posterior lower quadrant. Patient unable to blow air through perforation. Moderate tenderness over antrum, none over tip. No redness or edema.

Aug. 9. Patient has remained about the same since admission. Seen several times by Mr. Heath, who advised operation. Tenderness less. Profuse discharge from M. E. Transillumination by Dr. Mosher shows slightly light antrum and dark tip.

Aug. 10. Operation. Ether. Mr. Heath. Cortex exposed in usual way. Pericranial flap cut. On opening cortex pus continued to discharge for some time. Probe passed ⅔ inch upward into antrum and for same distance downward to tip. After pus, blood flowed for some time from the vascular mucous membrane of antrum. This hemorrhage caused slight delay. Antrum treated in usual way with burr. Tip exposed and most of outer wall of a large tip cell removed. Granular tissue in cell left. Small wick drain at tip. Wound closed with one s. w. g. suture.

Aug. 12. Sutures removed. Tube changed.

Aug. 14. Patient dressed daily by Mr. Heath. Tube changed and antrum and tympanic dressing changed daily.

Aug. 18. Incision slightly gaping for full extent. Slight amount of secretion expressed from top. Base of flap which bounds meatus posteriorly and just below helix turned outward, leaving small granulating area. Antrum still large. M. T. not seen. Valsalva negative.

Aug. 20. Gauze moderately stained with pyocyaneus. Incision slightly separated in upper one-half and whole of incision uncaught. Much mucopurulent secretion about tube. Abundant granulations on edges of incision through helix. also on posterior half of meatus. Antrum still large. One-half of bridge covered with granulations. Valsalva successful. Moderate amount of watery discharge blown through. Posterior third of M. T. seen.

Aug. 28. Upper third of incision granulating. Lower third of incision granulating. Incision through crus of helix healed. No deformity. Moderate amount of pus about tube. Wick well saturated with pus. End of canal flap slightly projecting. Roof slightly projecting. Antrum only slightly granular about edges. Bridge covered with granulations except superiorly. Small rim of granulations on bridge anteriorly covering one-third M. T. Valsalva successful. Mucopurulent discharge blown from M. E. Rise of temperature which occurred two days ago has subsided. Gauze wick to antrum and tympanum. White blood count 20,000.

Sept. 6. Incision in lower two-thirds healed. Upper one-third gaping. Flap well in position posteriorly. Superiorly the canal wall falls a little. Antrum apparently very little granulated in. Bridge covered with granulations. Valsalva negative. Rim of granulations extends from bridge and obscure upper half of M. T. Granulations removed from posterior part of bridge. Plain gauze to antrum. Zinc sulphate to M. T.

Sept. 27. Since last note patient has been dressed by Dr. Plummer. No tag or flap in region of antrum, hole 4 cm. in diameter into which probe enters 1 cm. Area of granulations on bridge posteriorly, superiorly. Removed and site touched with Ag. No_3 bead.

Oct. 4. M. E. still continues to discharge slightly. Antrum shows no signs of filling in.

Oct. 14. Condition of antrum same as at note of Sept. 27. About one-quarter of posterior half of M. E. seen, red and granular. Bridge granular, and slight discharge from M. E.

Oct. 14. Discharged relieved to O. P. D.

August 5, 1912.

R					L
18					1
—		W			—
25					25
—		V			—
21		AC		25″	0?
—	F 512 V. S.	——	—	——	—
13		BC		12″	13
		WEBER > F 256 V. S.			
N		LIMITS GALTON			N
80 V. S.		LOW			V. S. 128

October 14, 1912.

R					L
18					1
—		W			—
25					25
—		V			—
30		AC		25″	15
—	F 512 V. S.	——	—	——	—
26		BC		12″	25
		WEBER F 256 V. S.			
N		LIMITS GALTON			N
80 V. S.		LOW			V. S. 256

Vol. 34, page 21. Elizabeth Taylor, age 21. Birthplace, Mass. Residence, 22 Usher Road, West Medford. August 6, 1912.

Diagnosis: A. S. o. m. s. ch. Exostosis of canal.

Operation: Heath radical mastoid.

History: A. S. patient has had pain and discharge from A. S. for past 17 years, following scarlet fever. Has had treatment frequently since, beginning with discharge. Since August 4th she has had occasional pain. P. E. negative. Urine negative.

Examination: A. S. About 1 cm. from beginning of external auditory canal, canal closed entirely by a diaphragm of fibrous tissue at the superior part of which over an area the size of a large pin head there is crusting. Through this area probe can be passed into M. E.

Aug. 7. Operation. Ether. Mr. Heath. Usual Heath incision, etc., but in this case the bony exostosis was removed together with posterior canal wall. No ossicles found in M. E.

Aug. 8. Sutures removed and dressing reapplied.

Aug. 12. Posterior wound healed. Dressed every day and tube changed.

Aug. 16. Up and about. Small area of granulations coming from tympanic cavity.

Aug. 21. Antrum well filled in with granulations. Considerable amount of granulations over bridge and at posterior part of M. T. Incision in helix well healed.

Aug. 26. Tube has been shortened. Discharge less, but still copious. Zinc sulphate, 10% to grans.

Sept. 2. Tube omitted. Dressed daily. Zinc sulph. to M. E. Sharlach red to cavity.

Sept. 6. For past two days patient has complained of pain over original incision, which is tender to pressure. Considerable redness and swelling at lower part. Incision reopened and about one-half dram of pus expressed. Wicked. Hot sulphonaphthol poultices. Cavity doing nicely and considerable part now epidermatized anteriorly.

Sept. 12. Infection mostly quieted down, but still a little discharge of pus from wound.

Sept. 19. Small area in lower part of incision which is not closed. M. E. closed from view by area of granulations. Up to beginning of old hyperostosis cavity is well epidermatized.

Sept. 27. One-half inch from lower end of incision small fistula one-half inch in length. No bone felt and apparently does not connect with canal. Canal narrow in region of old hyperostosis, beyond which a mass of granulations hide M. E. Posteriorly and superiorly probe strikes bare bone. $Ag\ No_3$ bead continued to granulations.

Oct. 5. Granulations in region of M. E. which repeated application of $Ag\ No_3$ bead does not keep down. Considerable amount of purulent discharge continues. Posterior sinus now healed.

Oct. 6. Region of M. E. filled with granulations except for small opening the size of pin head. This opening anteriorly reaches into region of M. E. Slight discharge continues from M. E.

Oct. 7. Discharged relieved to O. P. D.

August 6, 1912.

R					L
18					1
—		W			—
25					4
—		V			—
					40
14		AC		25″	0
—	F 512 V. S.	—	—	—	—
10		BC		12″	3
	WEBER		F 256 V. S.		
N		LIMITS GALTON			N
80 V. S.		LOW			V. S. 2048

October 7, 1912.

R					L
18					1
—		W			—
25					12
—		V			—
					40
15		AC		25″	0
—	F 512 V. S.	—	—	—	—
20		BC		12″	0
	WEBER	<	F 256 V. S.		
N		LIMITS GALTON			N
80 V. S.		LOW			V. S. 2048

Vol. 35, page 103. Name, Elizabeth Taylor. Age, 21. Birthplace, Massachusetts. Residence, 22 Maher Road, West Medford, Mass. Occupation, nurse. Nov. 12, 1912. (Reentry.)

Diagnosis: A. S. o. m. s. ch. with recurrent mastoiditis.

Operation: Radical mastoid. Skin graft (primary). Dr. Jack.

History: A. S. Heath operation by Mr. Heath, August 7, 1912. Discharge 17 years previous to operation continuing to present. Operated on six years ago by Dr. Plummer. Since operation has had a continual M. E. discharge and a gradually progressive narrowing of canal.

Examination: Canal is almost entirely obstructed with newly formed tissue. One small opening is seen, through which pus of a mucopurulent character oozes. Slight tenderness over upper mastoid.

Nov. 20. Operation. Ether. Dr. Jack. Usual mastoid incision. Periosteum retracted. Cortex exposed and removed. Mastoid curetted out. Part of posterior wall was previously removed by Mr. Heath. Removal down to facial ridge completed. Small sinus leading to the dura over tegmen antri found. Antrum found and curetted. Ossicles removed.

Primary skin graft taken from right thigh, cut dry. Applied in mastoid cavity and sucked into middle ear. Held in place by a number of cotton pledgets. Wound packed lightly with iodoform tape and closed by four s. w. g. sutures. Thigh wound covered with cargile membrane and gauze.

Patient stopped breathing while coming out of ether, but recovered slowly.

Nov. 25. Stitches removed from posterior wound, also iodoform tape from axilla. Heart well compensated, and not enlarged pathologically. Urine negative.

Examination: A. S. shows well epidermatized radical cavity. Old scar over mastoid which is slightly reddened and swollen and tender in upper part.

Feb. 19. Operation. Ether. Dr. Jack. Incision in old scar. Old cavity exposed and well epidermatized in lower part. Cavity leading to dura filled with soft granulations. Dura normal. Grans. cleaned out. Wound closed entirely with four s. w. g. sutures. Iodoform gauze lightly packed into affected area through the canal. Dry dressing and bandage. Good ether recovery.

Feb. 23. Small granulation in bowl cauterized. Cavity looks well otherwise. Posterior wound doing well. Patient up.

Feb. 26. Doing well. M. E. still discharges, and granulations appear as above.

Feb. 29. Less discharge. Not many grans. seen now.

Mar. 1. Discharged relieved to Dr. Jack.

PART II.

Abstracts of the cases. The abstracts are grouped according to classes, and are not given in chronologic order. The following are the abstracts:

Case 1.—August 12, 1912. Margaret Donovan. White. Age, 6. American. Service of Dr. Plummer.

Diagnosis: Otitis media suppurativa acuta. A. S. Otitis media suppurativa acuta. A. D. Recurrent mastoiditis. Postaural abscess, A. D.

History: The patient was admitted to this hospital on Jan. 19, 1912 (i. e., eight months ago), suffering from otitis media suppurativa acuta and mastoiditis and postaural abscess A. D. A mastoid operation was done by Dr. Lothrop, the senior house surgeon, in which the abscess was incised and drained. The cortex was found to be perforated near the canal. The cortex was removed and all the soft cells curetted out. The antrum was found and curetted. The sinus was exposed but not opened. The patient was discharged on Feb. 1, 1912. The right ear was well until last Monday (one week ago), when the pain commenced and has lasted to date. There has been considerable discharge for the past three days. Mastoid tenderness has existed for four days, and swelling for three days.

Physical Examination: Negative.

Examination: On the right mastoid there is a scar of the previous operation. There is marked postaural redness, bulging and fluctuation. A small round perforation exists in the lower posterior part of the drum. Through this comes a profuse purulent discharge. The drum of the left ear is red and bulging and no landmarks are seen. Under primary ether the left drum was incised.

Aug. 13. Operation. Heath conservative mastoid. Operator, Mr. Heath. Usual Heath incision. Pericranial flap cut. About half an ounce of pus escaped from under the periosteum. A small pin head perforation was found in the reformed lateral wall of the mastoid. The further steps of the operation were carried out in the manner usually followed by Mr. Heath.

Oct. 7. (One week short of two months.) The middle ear is dry. Most of the drum can be seen, and the antrum has been filled with granulations and its site is epidermatized.

April 26, 1913. (Condition today.) The mother says that the child left the hospital four months ago with the ear dry and that it has remained so. She notices no impairment in the girl's hearing.

Examination: Two scars are present behind the ear. One is one-half cm. behind the crease where the auricle joins the head and the other one-half cm. in front of this, and on the auricle. The incision on the auricle is the one made by Mr. Heath. In order to avoid the scar of the first operation Mr. Heath's incision was made either a little forward of the crease where the auricle joins the head or it has retracted into this position. There is no deformity of the crus helicus. The beginning of the cartilaginous canal is narrowed slightly at the top, but this is so little that it does not interfere with examination in any way. Within the canal and posteriorly and externally there is a slight excavation in the body of the mastoid. The cavity of the antrum has been obliterated flush with the annulus. The operative field is fully and firmly epidermatized. The bridge between the site of the antrum and the drum stands out clearly. The ear is dry. The whole of the lower posterior quadrant and half of the upper posterior quadrant of the drum is occupied by a thin atrophic scar. Two mm. in front of the handle of the malleus and parallel with it there is a thickened line of calcification about one mm. wide and four mm. long. The drum is not retracted. The drum of the other ear is slightly dull.

Hearing test:

April 26. 1913.

R				L
$\frac{18}{25}$		W		$\frac{18}{25}$
$\frac{18}{15}$	512 V. S.	$\frac{AC}{BC}$ —	$\frac{25''}{12''}$	$\frac{20}{10}$
		WEBER <		
N		LIMITS GALTON		N
96 SURE		LOW V. S.		SURE 96
64 ?				? 64

Comments on this case.—This is the best result of the seven. It was a case of recurrent mastoiditis and recurrent postaural abscess. The case was first operated upon by the simple mastoid operation with posterior drainage, and then by Mr. Heath with drainage only through the canal. The records do not show that the postaural abscess was at either time as large and foul as in the other case of mastoiditis and postaural abscess operated upon by Mr. Heath with less success. (See below.)

Case 2.—August 2, 1912. Joseph Weinstein. Single. Age, 21. Russian. Service of Dr. Plummer.

Diagnosis: Otitis media suppurativa acuta. A. D. Mastoiditis.

History: The patient has had a head cold for three weeks. With this he had pain in the right ear for one day. The drum was opened by his local physician, and the middle ear has discharged since. The pain stopped until two days ago, when it returned severely at intervals. There has been occasional headache and some mastoid tenderness.

Physical examination: Negative.

Examination: The mastoid shows considerable tenderness over the antrum and the tip. A profuse purulent discharge comes from the middle ear from a large irregular perforation in the posterior lower quadrant. There is a moderate amount of edema of the superior canal wall.

Aug. 3. Operation. Heath conserative mastoid. Operator, Mr. Heath. Usual Heath incision, etc. On the seventh day after the operation the temperature rose to 105° and remained above normal for a few days. No cause was found. About one month after the operation, the antrum was one-half obliterated by granulations. For about two months the end of the posterior flap and the edge of the superior canal wall where it was incised in the making of the flap projected into the canal and interfered somewhat with the after-treatment. At this time a note was made that the flap had gone back into place and that the incision through the crus helicis was healed without deformity and that the site of the antrum was represented by a slight dimple the cavity of which was well epidermatized.

Sept. 25. The patient has adenitis on the right side of the neck. This was treated with hot sulphonaphthol poultices. On the fifth day the right tonsil was removed. The patient did poorly under ether and the left tonsil was not touched. No point of infection was found.

Oct. 21. The adenitis is well, but the middle ear is still slightly moist. Two-thirds of the area of the drum can be seen. There is a small perforation in the lower posterior quadrant. The antrum is well epidermatized. The patient was discharged today to the Out-Patient Department.

April 26, 1913. Condition today, the patient did not report for examination.

Comment on this case.—The antrum was obliterated and epidermatized at the end of two months. Insufficient drainage through the canal was the probable explanation of the temperature for a short time a week after the operation and for the infection of the neck later. The ear was not dry at the end of two months. A test made a week after leaving the hospital showed no loss of hearing.

Case 3.—July 31, 1912. Frank Sapanari. White. Age 30. Italian laborer. Service of Dr. Plummer.

Diagnosis: Otitis media suppurativa acuta. A. D. Mastoiditis.

History: Two months ago the patient had pain below the right auricle. It soon went away. One month later the ear felt blocked. The patient came to the Out-Patient Department and had cerumen syringed out of both ears. At that time he had otitis externa diffusa in the right ear, and on July 2nd, 1912, the canal was incised. Six days ago the ear began to discharge and a day later the mastoid became tender and has remained so since.

Physical examination: Negative.

Examination: The external canal of the right ear is filled with a polyp. There is a purulent discharge from the middle ear. No part of the drum can be seen. Marked tenderness is present over the antrum and the tip of the mastoid and at the site of the emissary vein.

Aug. 4. The polyp was removed from the right ear in order to give better drainage.

Aug. 8. The patient was examined with nasopharyngoscope by Dr. Emerson. The examination showed a sharp spur on the right side of the septum, and the spur was in contact with the turbinates. The posterior ends of the inferior turbinates were large. The vault was congested, especially on the right.

Aug. 9. Operation. Heath conservative mastoid. Operator, Mr. Heath. Usual Heath incision, etc.

Aug. 28. (Nineteen days after the operation.) The upper part of the skin incision has been healed for some time; the lower part has just healed. The incision through the crus of the helix has healed with gaping. There is a slight discharge around the rubber tube in the canal. There is a small tag at the middle of the superior wall. Inflation by the Valsalva method blows clear mucus through a perforation near the edge of the bridge. Zinc sulph. applied.

Sept. 27. The canal is narrowed a little externally. Superiorly a ridge projects from the canal wall. There is an opening into the antrum 2 mm. in diameter. From this comes a pulsating discharge. The drum is hard to distinguish. There has been a profuse purulent discharge from the middle ear until the last three days. Drops of boracic acid and alcohol solution were ordered to be put into the ear twice daily. The granulations were touched with a bead of nitrate of silver.

Oct. 10. (One week less than two months after the operation.) For the past few days the discharge from the middle ear has been less than before. The antrum, however, has not filled in.

Hearing test at entrance, August 3, 1912. No record of hearing test at discharge.

August 3, 1912.

R					L
$\frac{^1/_6}{25}$		W			$\frac{18}{25}$
$\frac{5}{11}$	512 v. s.	$\frac{AC}{BC}$	—	$\frac{25''}{12''}$	$\frac{10}{15}$
		WEBER <			
N 128		LIMITS GALTON LOW			N 80

April 26, 1913. (Condition today.) This case did not report for a final examination. He came to the Out-Patient Department very irregularly. The last note was made December 16, 1912, four months after the operation. The note reads: The discharge from the ear stopped one month ago or three months after the operation. The cartilaginous canal is slightly narrowed. There is no deformity of the crus of the helix. The operative excavation in the mastoid is represented by a slight bowl. The antrum is fully granulated and epidermatized. Only the lower third of the drum can be seen. The ear is dry.

No final hearing test is recorded.

Comments on this case.—At the end of a month the antrum had granulated in one-half, but at the end of the second month obliteration of the antrum had not yet been accomplished. However, judging from the last note, the antrum filled and became epidermatized somewhere in the third month, and the discharge stopped.

Case 4.—August 14, 1912. Louis Kaplan. Age, 2. American. Service of Dr. Plummer.

Diagnosis: Otitis media suppurativa acuta. A. S. Mastoiditis. Postaural abscess.

History: The child has had a discharge from the left ear for the past ten days. Swelling developed over the mastoid region six days ago.

Physical examination: Negative.

Examination: On the left side there is postaural redness, edema and tenderness. Palpation shows a well local postaural abscess. The drum is red and bulges posteriorly. No perforation is seen. There is considerable purulent discharge in the canal.

Aug. 15. Operation. Heath conservative mastoid. Operator, Mr. Heath. Usual Heath incision, etc. A large and very foul postaural abscess was opened. This burrowed upward under the temporal muscles. Owing to the extent of the abscess it seemed to one of the writers (Dr. Mosher) that drainage through the canal only, as Mr. Heath proposed to provide for it, might not be sufficient. At the close of the operation he asked Mr. Heath about this, and Mr. Heath answered that he thought it might be sufficient.

This case did not do well. The superior canal wall hung down and the posterior flap sprang forward from the bowl of the mastoid excavation. Both the posterior flap and the superior canal wall became boggy and thick and practically blocked off the middle ear. The incision through the crus helicis spread widely so that it became necessary after a week to withdraw the rubber drainage tube from the canal and to substitute a gauze wick. The skin incision healed, but on the tenth day broke open at the lower part. The ear continued to discharge both through the canal and through the postauricular opening so that about a week short of four months after the operation Dr. Jack reoperated the case.

Dec. 5, 1912. Operation. Radical mastoid. Operator, Dr. Jack. The incision was made close to the auricle in order to repeat the original incision. The remaining steps of the operation were those of the familiar radical mastoid exenteration. A small skin graft was placed in the cavity. The incision for the radical operation did not unite and the dressings were done from the postauricular opening.

Since leaving the hospital the child has been brought to the hospital once a week for treatment of the radical cavity.

April 26, 1913. (Condition today.) There is a large postauricular wound. The bowl of the radical mastoid cavity is packed with plain gauze, and a small iodoform wick fills the middle ear. On removing the wicks the bowl of the radical cavity is found to be well epidermatized. The antrum and middle ear, however, are not epidermatized, and small, flat granulations are present in the antrum. The middle ear is narrowed from above downward, so that one-third of its cavity has been lost.

No hearing test.

Comment: The natural comment on this case is that the drainage of the postaural abscess was insufficient, and being insufficient the case went on to a radical mastoid operation. whereas in most of such cases the simple mastoid operation and ample posterior drainage would have been all that was necessary. The radical mastoid operation produces a vastly greater loss of hearing than the simple operation. It should be borne in mind, however, that cases of this kind at times do badly and require more than one operative interference.

Case 5.—July 19, 1912. Russell Noyes. Age, 12. American. Service of Dr. Hammond.

Diagnosis: Otitis media suppurativa chrônica. A. S.

History: About once a year for the past six years the patient has had a dischage from the left ear. This was accompanied by deafness.

Physical examination: The left ear shows a large perforation which involves the posterior half of the drum. The incudostapedial joint is exposed and is covered with granulations. The promontory is similarly covered. There is considerable purulent discharge. The right drum is atrophic.

July 29. Under local treatment the ear has shown no signs of improvement.

Aug. 12. Operation. Heath conservative mastoid. Operator. Mr. Heath.

Oct. 19. The house record reads as follows: "The antrum is granulated except for a cavity 4 mm. in diameter and 4 mm. deep. There is a very slight moisture in the middle ear. The anterior half of the drum is covered with granulations."

Dec. 28. (Four months after operation.) The last house record reads: "Considerable discharge. Slight moisture in the antrum, but antrum well epidermatized."

April 26, 1913. (Condition today.) Since leaving the hospital the mother says that the boy's ear was dry until two months ago. It is probable, however, that the ear has never been absolutely dry. The boy has been coming to the Out-Patient Department once a week for treatment, and drops of the usual boracic acid and alcohol solution has been used in the ear most of this time. According to the mother's story two months ago, after a shower bath at school, the ear began to run and discharged for two weeks. After the exacerbation attributed to the shower bath, the discharge was not noticed again until one week ago. The mother thinks that the operated ear falls away from the head a little more than the other ear does.

Examination: Both ears are large. There is a very slight lop ear on the operated side. The scar of the incision is in the crease where the auricle joins the head. There is a slight deformity of the crus helicis, i. e., the posterior half of the crus is a little smaller than the front half, and where the two join there is a very slight angular deficiency at the top and botom of the scar. The cartilaginous canal is slightly narrowed, especially superiorly, for 1 cm. inward. A good sized speculum can be made to pass the narrowing easily. Two drops of pus were wiped out of the canal. Where the posterior wall of the canal was taken down at the operation and an excavation made in the mastoid, no cavity now remains.

One-third of the antral cavity is obliterated, epidermatized and dry. On the superior wall of the canal half way to the drum a good sized polyp hangs downward. At the root of this the probe detects a spot of necrosis. The bridge between the antrum and the drum stands out clearly. The drum has no landmarks, and is thickened and covered with epithelial débris. In the posterior inferior quadrant there is a two mm. perforation. Through this when the patient practices inflation by the Valsalva method, soft granulations and pus are blown. Behind the perforation and on the edge of the annulus there are few soft granulations.

December 28, 1912.

R				L
18		W		15
—				—
25				25
36		AC	25″	17
—	512 v. s.	—— —	——	—
21		BC	12″	14
		WEBER <		
N		LIMITS GALTON		N
96		LOW LIMIT		96

April 26, 1913.

R				L
18		W		5
—				—
25				25
22		AC	25″	18
—	512 v. s.	—— —	——	—
15		BC	12″	13
		WEBER <		
N		LIMITS GALTON		N
64		LOW LIMIT		96 i. e. G.

Comment: Some time between the third and the fourth month the antrum granulated in as much as it was going to and became epidermatized. The discharge lessened during the treatment, but the ear has never been seen dry at the hospital. If this case had been operated by either of the writers of this report a radical mastoid operation would have been performed. Eight months, of course, is a long time to have a radical cavity remain moist, but many of us have had such cases. The middle ear is still involved, and what the final outcome of the case will be is not yet clear. Since leaving the hospital there has been a marked loss of hearing, but the hearing is better than one would expect from the appearance of the ear. As the antrum has been partly obliterated and is dry, it would seem that the ossicles were responsible for the continuance of the trouble.

Case 6.—August 5, 1912. Daniel Murphy. White. Age, 13. American. Service of Dr. Plummer.

Diagnosis: Effectus otitis media suppurativa chronica. A. S.

History: Acute exacerbation.

Three weeks ago the present attack started. Mastoid tenderness developed this morning, but there was no swelling. The patient gives a history of a similar attack one year ago.

Physical examination: Negative.

Examination: There is a profuse purulent discharge from the middle ear on the left. The drum is red but not bulging, and there is a small perforation in the lower posterior quadrant. The patient cannot blow air through the perforation. Moderate tenderness is present over the antrum of the mastoid but not at the tip. Neither redness nor edema is present.

Aug. 9. The patient has remained the same since admission. Mr. Heath saw him several times and advised operation. The tenderness is less. A profuse discharge continues from the middle ear. Transillumination shows a slightly light antrum and a dark tip.

Aug. 10. Operation. Heath conservative mastoid. Operator, Mr. Heath. Usual Heath incision and operation.

Aug. 28. The following note was made in the house records on this date. It is in some respects characteristic: "The upper third of the incision is granulating. The lower third of the incision is granulating also. The incision through the crus of the helix is healed without deformity. There is a moderate amount of pus about the rubber drainage tube which holds the canal open. The wick which passes through this is well saturated with pus. The inner end of the canal flap projects slightly. The anterior border of the canal flap and the roof of the canal project slightly. The antrum shows but a few granulations about the edges. The bridge is covered with granulations except superiorly. On the anterior surface of the bridge there is a small rim of granulations which obscure the upper third of the drum. Inflation by the Valsalva method is successful, and mucopurulent discharge is blown from the middle ear." The typical part of this note consists in what is said about the granulations from the bridge and the displacement of the segments of the canal.

Oct. 4. The middle ear continues to discharge slightly. The antrum shows no signs of filling in.

Oct. 14. This note was made two months after the operation, when the patient was discharged to the Out-Patient Department. The condition of the antrum is the same as in the last note of Sept. 27, i. e., no tag or flap is present in the region of the antrum. The cavity of the antrum is represented by a hole 4 m. m. in diameter into which a probe enetrs. Today, October 14, "About one-fourth of the posterior half of the drum can be seen. The drum is red and granular. The bridge is granular and there is a slight discharge from the middle ear."

April 26, 1913.

Hearing Test at Entrance.

R				L
18				1
—	W			—
25				25
2	AC	—	25″	0?
—	—		—	—
13	BC		12″	13
	> WEBER			
N	LIMITS GALTON			N
80	LOW LIMIT			128

April 26, 1913.

Final Hearing Test Seven Months After Operation.

R					L
18					1
—		W			—
25					25
33		AC	—	25″	5
—	512 v. s.	—		—	—
18		BC		12″	18
		WEBER <			
N		LIMITS GALTON			N
64		LOW LIMIT			? 96-G

April 26, 1913. (Condition today.) The mother says that the cotton in the ear is always moist, and that the ear has never remained dry for more than one week since the operation.

Examination: The scar of the incision is in the crease where the auricle joins the head. There is a slight deformity of the crus helicis with narrowing of the canal, especially superiorly, for 1 cm. inward. There is a small amount of secretion in the canal. There is no bowl in the mastoid corresponding to the operative excavation. The antrum apparently is not filled in at all, and the cavity of the antrum is moist. A crescentic fold of mucous membrane springs from the bridge and is parallel with it. This fold at the top measures about 1 mm. from before backward. There is a good sized perforation in the posterior inferior quadrant of the drum, while the remainder of the drum is thickened, boggy and without landmarks. Inflation by the Valsalva method is not successful, either through the drum, or through the aditus and antrum. A probe introduced into the antrum apparently enters the aditus.

Comments on this case: After seven months the antrum has not filled in. The middle ear is still moist and there is a great loss of hearing.

Case 7.—August 6, 1912. Elizabeth Taylor. Age, 21. American. Nurse. Service of Dr. Plummer.

Diagnosis: Otitis media suppurativa chronica. A. S. Exostosis of canal.

History: The patient has had pain and discharge from the left ear for the past seventeen years, following scarlet fever. Since the beginning of the discharge she has had much treatment. Since Aug. 4th of this year she has had occasional pain.

Physical examination: Negative.

Examination: About 1 cm. from the beginning of the external auditory canal, the canal is closel entirely by a diaphragm of fibrous tissue at the superior part of which over an area the size of a large pin head there is crusting. Through this area a probe can be passed into the middle ear.

Aug. 7. Operation. Heath radical mastoid. Operator, Mr. Heath. Usual Heath incision, etc. The exostosis was removed together with the posterior canal wall, and thus a new bony canal was formed. No ossicles were found in the middle ear. (The presence of the exostosis made the finding of landmarks and the performance of the operation very difficult. Comp's.)

This case did not do well and was finally reoperated three months later by Dr. Jack.

Examination: The canal is almost entirely obstructed by newly formed tissue. A small opening is present through which pus of a mucopurulent character oozes. There is a slight tenderness over the upper part of the mastoid.

Nov. 20. Operation. Radical mastoid operation. Operator, Dr. Jack. Usual mastoid incision. Periosteum retracted, and the cortex exposed and removed. Mastoid cells curetted out. As only a part of the posterior canal wall had been removed by Mr. Heath, the removal of the wall was completed down to the facial ridge. A small sinus was found, which led to the dura over the roof of the attic of the middle ear. The lateral sinus was far forward. The antrum had not been opened in the operation of Mr. Heath. The antrum was found by Dr. Jack and curetted. The ossicles which were not found in the first operation, were located and removed. A primary skin graft was placed in the operative cavity.

Three months later the scar over the mastoid became reddened in the upper part and swollen and tender.

Feb. 19, 1912. Operation. Reopening and curetting of radical cavity. Operator, Dr. Jack. Incision in old scar. The old cavity was exposed and found to be well epidermatized in the lower part. The cavity over the middle ear which had been taken by Mr. Heath for the antrum, was filled with soft granulations. The dura was normal. The granulations were cleaned out. The wound was closed entirely, and iodoform gauze packed lightly into the curetted area through the canal.

Feb. 23. A small granulation in the bowl of the mastoid cavity curetted. The cavity looks well otherwise. The posterior wound is doing well.

Feb. 26. The middle ear still discharges. Granulations in the bowl.

Feb. 29. The discharge has lessened and there are not many granulations.

Mar. 1. The patient was discharged relieved to Dr. Jack. When last seen by Dr. Jack, the radical cavity was epidermatized and dry.

April 26, 1913. (Condition today.) The patient was out of town and answered by letter that she would report for examination when she returned.

The comments on this difficult case which the compilers would make are as follows: Before this case came to the hospital it was operated by Dr. Plummer and the exostosis removed. When Mr. Heath operated, the exostosis had returned. Mr. Heath's incision and partial removal of the posterior wall and the mastoid cells caused him to miss the antrum and to open the middle fossa, and to consider the operative cavity thus made as the antrum. A complete tympanomastoid exenteration became necessary at the hands of Dr. Jack. The primary skin graft put in by the second operator was in great part successful. The cavity above the attic of the middle ear refilled with granulations, did not drain and infected the upper portion of the scar. This necessitated the reopening of the radical cavity and a second curetting.

SUMMARY OF RESULTS.

The seven cases operated upon by Mr. Heath fall into the following groups: Two cases of otitis media suppurativa with mastoiditis; two cases of otitis media suppurativa acuta with mastoiditis and postaural abscess (one of these cases was recurrent); three cases of otitis media suppurativa chronica. Two of the seven cases required reoperation, i. e., one case of mastoiditis with postaural abscess which came to a radical operation, and one chronic case, the one that had the recurrent exostosis of the canal. This also came to a radical operation.

Of the acute cases two are known to be dry and to have the antrum filled in and epidermatized and to have whole drums. The shortest time in which the middle ear became dry was seven weeks. The acute case which ranks next had the middle ear dry, and the antrum obliterated and epidermatized somewhere in the third month. The third had the antrum epidermatized and dry in two months and a half, but the middle ear was still moist.

Two of the three chronic cases are still discharging after seven months. In the first of these the antrum is one-third obliterated and epidermatized; but in the second it has not filled in at all.

Of the two reoperated cases, the first one, the two and a half year old child with postaural abscess which ended with a radical, is two-thirds healed. The second, the one with the recurrent exostosis which required a full radical, is well.

The results as to hearing in the seven cases are as follows: In the first of the acute cases there has been no impairment; in the second the hearing was not impaired when the patient was discharged from the hospital; in the third, the last note says that the antrum was granulated flush with the annulus and epidermatized and that the drum was normal. In this third case, although there is no record of the fact, it is fair to presume that little if any impairment of hearing has followed the operation. In the fouth and last of the acute cases a radical operation was necessary, so that a severe loss of hearing has resulted. As the patient is only two and a half years old, no test has been made. Of the three chronic cases one shows a slight loss of hearing since operation, and one a large loss; whereas in the third case the patient was practically deaf in the diseased ear and probably shows but little loss. This case did not report for final examination. (See above.) A test made in the middle of her hospital stay and just before the radical operation, showed but a slight advance in the deafness. To sum up the hearing results, it can be said that in three of the four acute cases there was no loss of hearing. One of these cases required a radical operation and sustained a severe loss. In the chronic cases one had a slight loss, one a severe loss, and in the third, the ear was practically deaf and there has been but slight change for the worse.

The subject of the paper, as stated in the beginning, is "A Report of the Results of Seven Cases Operated Upon by Mr. Heath." With the preceding paragraph, therefore, this report has reached its logical end. There are other topics, however, which are vitally connected with the Heath operation that have not been touched upon. There is great risk if any of these are now brought up of spoiling the symmetry of the paper and of starting an avalanche of discussion. Notwithstanding this, the writers wish to continue for a few more paragraphs and to make some observation on the after-course of the operated cases. They hope in so doing that they do not offend. First of all it should be borne in mind in considering these seven cases that they are relatively too few in number to draw hard and fast conclusions from them. Moreover, when a surgeon operates away from home and leaves the after-treatment of his cases to others the results are sure to be less favorable than they would have been had he finished the cases himself. A letter recently received from Mr. Heath called attention to this fact. Therefore, every allowance should be made. On the other hand, however, if Mr. Heath's operation is to be done by anyone except himself, the after-treatment must not be so difficult that men of average ability cannot carry it out. You may put me in that class if you like, but I will not permit my superior, Dr. Plummer, to be spoken of in that way.

So much for that point. Now for the others. The scar left by the skin incision of Mr. Heath, coming as it does in the crease where the auricle joins the head, is practically invisible, and is the best looking scar known to the writers. This is all that can be said in its favor, because by making the incision so far forward the mastoid is not sufficiently uncovered to get at all possible foci of disease. The tip of the mastoid and the lateral sinus are not easily dealt with through such an incision. When Mr. Heath was questioned about this, he replied that he always stood ready to make a supplementary horizontal incision. He did not find it necessary, however, to do this in any of the seven cases, in spite of the fact that in one of them he missed the antrum, and unknowingly and fortunately missed a forward lying sinus. Not only would the additional incision have helped greatly in this very hard operation, but if he had attacked the mastoid through the outer wall in the usual way, instead of through the posterior canal wall, as is his custom, the case would have been infinitely easier and probably more successful. Mr. Heath's incision through the crus of the helix gives a temporary widening of the cartilaginous canal which is very useful. It heals with little if any deformity.

For the first week after Mr. Heath's operation it is a surgical pleasure to look through the widely open canal and to see in the field, behind and above, the round opening of the antrum, and in front the whole of the drum, while between the glistening bone of the bridge stands out sharply. The pleasant impression produced by this is increased when one looks behind the auricle and sees the almost invisible scar. One is impressed agreeably, also, by the fact that there are no wicks to be put in and taken out through a gaping posterior wound. Everything can be done through the canal. A bit later, when, in spite of all care, granulations begin to spring from the bridge the picture changes to a less pleasing one. Granulations bud from the bridge and from the posterior and the superior part of the anulus, and soon obscure a large part of the drum and dam back the discharge. At the same time, in some cases, the superior wall of the canal sags and the flap made from the posterior wall breaks from its moorings and projects forward into the lumen of the canal, obscuring the view and hampering the dressings. The segments of the canal will finally go back into place and the end results show that the extensive upset of the canal which occurs at the operation and continues for a time afterwards produces only a slight and insignificant narrowing. The most serious drawback in the convalescence of the cases is caused, as has just been stated, by the granulations which spring from the bridge and annulus, because they block off the drum, wholly or in part. In three of the four acute cases the antrum filled flush with the annulus, and epidermatized, and the ear became dry. But in none of the three was the time necessary to accomplish these results as short as is often the case when such cases are operated upon in the usual way. None of the chronic cases in our opinion did as well as they would have done had they been operated by the full radical mastoid operation with cleaning out of the middle ear. The serious defect of the Heath operation is that it attempts to deal with the mastoid process from an awkward angle, and through a restricted space, namely, the posterior canal wall. The operation has something about it of the nature of a stunt. It can be done and done successfully. The vital defect of the operation is insufficient exposure of the mastoid surface, and incomplete removal of pathologic conditions within it. Finally, and this observation brings up another point in connection with Mr. Heath's operating, we are under great obligations to him for reviving the question of operating early, both in acute and chronic cases, in order to preserve as much of the hearing as possible. Of late this reason for operating has fallen somewhat into the background. Mr. Heath has brought it vigorously to the foreground again. The writers of this paper wish to acknowledge the stimulating effect of Mr. Heath's visit. They wish to praise his mechanical dexterity, and his generous personality, and to express their appreciation of the force of a man who could make the otologic world stand, we cannot say stand and deliver, for that is not quite true,—who could make the otologic world stand and reconsider.

IV.

THE BRONCHOSCOPIC TREATMENT OF SPASMODIC ASTHMA.*

By George F. Keiper, A. M., M. D.,

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The introduction of the bronchoscope for the removal of foreign bodies from the tracheal tree opened fields of usefulness for that instrument not thought of at that time, namely, the direct inspection of the trachea and the larger bronchi, and the direct application of remedies in certain lung troubles, as bronchitis and bronchial asthma.

Accidentally Nowotny,[1] of Krakau, observed that a case of bronchial asthma was favorably influenced by direct application, through the bronchoscope, of a solution of cocain or novocain in epinephrin. Galebsky and Tretrop,[2] of St. Petersburg, treated eight cases of asthma, producing lasting results in seven. Ephriam,[3] of Breslau, reported results on one hundred cases of asthma thus treated, eighty-eight of them remaining under his observation. Seventy-two were much benefited, and of these, forty-eight had no recurrence for from one and one-half to eighteen months after the last treatment. Sixteen received no benefit whatever. Of the latter, seven were treated but once. He used the following solution:

Novocain	0.2
Epinephrin (1:1000)	1.0
Normal saline sol	10.0

From 5 to 7 cc. were sprayed into the bronchus.

Ephriam did not use the bronchoscope for each application, but rather introduced a catheter into the trachea and through it introduced his medicines. This procedure is not new by any means, for as far back as 1838 Dr. Horace Green, of New

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York, did the very same thing, using, of course, different remedies than epinephrin, then unknown.

Heilskov and Mahler[4] report thirty cases of bronchitis and asthma treated endoscopically. Six cases were completely cured, and eleven showed marked improvement. No benefit was obtained in the remainder. In all the asthma cases the patients experienced great relief. In all one hundred and twenty applications were made of a solution identical with that used by Ephriam. Ephriam's method of introducing a catheter into the trachea was followed in but a few cases.

Horn,[5] of San Francisco, reports a case that he treated with great benefit while at the University Laryngologic Clinic. University of Bonn, Germany, 1908-1909.

Freudenthal,[6] of New York City, reported that he had treated eleven cases successfully out of thirteen cases of spasmodic asthma. Eight were completely cured.

Large,[7] of Cleveland, reported one case in which he procured a cure after every possible operation was made upon the patient's nose and throat without avail.

This constitutes, briefly, the entire literature of the subject to date so far as I can ascertain. Enough cases have been reported to warrant in the future the treatment of desperate cases of spasmodic asthma through the bronchoscope, especially where all other measures have failed.

NATURE OF SPASMODIC ASTHMA.

That spasmodic asthma is a local affection and not a neurosis seems to be proven by the experiments of Auer and Lewis, who cut off all connection between the nervous system and the lungs, and yet were able to produce the paroxysms of asthma. Yet, as many cases of asthma have been cured by the removal of septal spurs, the amputation of hypertrophies of the middle turbinal bone, drainage of the nasal accessory sinuses, the regulation of the alimentary tract, the correction of uterine troubles, it is wise, in the milder cases at least, to relieve the patient of all possible conditions that might affect the patient reflexly. In other words, the bronchoscope is to be used after all other means have failed, or in desperate cases, like the one that I shall report, in which the patient need not wait for the treatment mentioned above.

OBSERVATIONS.

Several interesting observations have been made by those who up to date have reported cases.

Horn and Freudenthal report each a case where a scar-like mass obstructed the entire lumen of the bronchus. Local application of a twenty per cent solution of cocain overcame the contraction. In each instance this procedure was followed by a profuse secretion, so abundant as to compel Freudenthal to withdraw the tube. The secretion is liable to be profuse in any case after the withdrawal of the tube, as observed from Nowotny's experience to the present time. Great relief follows the expulsion of the secretion. Nowotny thinks that the relief experienced is due to that alone.

Spasm of the trachea and bronchi has been observed, so marked as to bar the further progress of the bronchoscopic tube or to compel its withdrawal. In some of these cases cocain and epinephrin would not suffice to relax the spasm.

Ulceration of the trachea and bronchi has been observed by Freudenthal.

Rhythmic contraction of the bronchus has been observed and in my own case so marked as to terrify one. It seemed as if a violent spasm was imminent.

As a rule bronchitis accompanies spasmodic asthma, and by the help of the bronchoscope we have opportunity to see how the mucosa of the respiratory tract appears, and if deemed necessary direct local treatment may be applied.

The mucosa of the tracheal tree may be so red and swollen as to hide the tracheal and bronchial rings from view. This appearance may lead one to doubt as to whether he is in the trachea at all. The breathing of the patient through the tube will, however, dispel any doubt as to where the tube may be.

Some of the cases are reported as cured by one application of the bronchoscope. How much suggestion had to do with the result no one can say. This much is true: the introduction of the tube released considerable secretion from the lungs, which secretion no doubt acted as a decided irritant to the mucosa of the respiratory tract, causing the spasm of the bronchi and bronchioles.

REPORT OF A CASE OF SPASMODIC ASTHMA SUCCESSFULLY TREATED THROUGH THE MEDIUM OF THE BRONCHOSCOPE.

William J. K., white, aged fifty years, fireman at the city pumping station, consulted me November 30, 1913, because of acute laryngitis. The examination had not proceeded far until symptoms of bronchial asthma manifested themselves. He stated that since the latter part of September he had suffered severely from asthma, having as many as three to five suffocative attacks every night. He was compelled to quit work. He had been in St. Elizabeth Hospital, under the care of Dr. Moses Baker, of this city. I communicated with Dr. Baker as to his patient's condition, and proposed the introduction of the bronchoscope and treatment through it because the patient was desperate for relief and willing to submit to any kind of treatment that might promise help.

He first consulted Dr. Baker on October 14, 1913, who, upon examination, diagnosed bronchitis, acute laryngitis and bronchial asthma.

The patient was a steady drinker. The only previous illness was "articular rheumatism" fourteen years before.

I quote some excerpts from Dr. Baker's record of the case:

"Eleven days ago he was in a draft and caught a cold. Since then he has been feverish, short of breath, coughs, raises white sputum, and has been sore in the chest. No chill."

"He is well developed and nourished. Temperature, 99°; pulse, 112; respiration, 24."

"Raises very tenacious mucus, which sticks to the inverted cup. On examination over the entire back are heard fine moist and sibilant rales."

"Treatment.—Calomel and salts. Codein, one-half grain at night. Syrup sedatole mustard plaster over chest. Taken from work and sent home to rest."

"October 20th: Patient greatly improved. Pulse, 100. Up and around. Allowed to work. Patient returns with original trouble. Cough is severe. Weather has been cold and wet. There is no fire where he lives. Patient sent to St. Elizabeth Hospital. Temperature, 99.5°; pulse, 100; respiration, 26. Many fine moist rales, and sibilant, over the back. Purged with calomel and salts. Codein administered together with inhalations."

"October 23rd: Patient improving. Rales remain in chest. Urine negative for albumin and sugar; no pus; orange yellow.

acid and clear. At 7 a. m., temperature, 98.2°; pulse, 76; respiration, 17. At 9 p. m., temperature, 99.4°; pulse, 90; respiration, 20."

"November 2nd: Chest symptoms much better and physical signs are disappearing fast. Patient allowed up in a chair."

"November 3rd: Temperature rose to 102.8.° Severe pain in the lumbar region. Typical herpes zoster at the region of the tenth intercostal nerve. Patient given urotropin, grains five, every four hours. Boric acid powder applied to eruption."

"November 5th: Pain very severe. Ichthyol ointment (50 per cent) applied to eruption."

"November 8th: Ichthyol ointment gave relief. Temperature, 101.°"

"November 22nd: Herpes zoster well. Temperature normal for ten days. Cough and other chest symptoms disappear."

"November 30th: Patient returns to office with typical asthmatic attacks." This is the date that I also saw him, and when I suggested bronchoscopy to him. He was advised to enter the hospital.

He entered St. Elizabeth Hospital for bronchoscopic treatment, which was delayed six days in order to replace the burned out lamp in my Kahler electroscope. In the meantime treatment was continued, which consisted in the hypodermic injections of epinephrin solution. Codein was given also, without relief.

On December 9th, early in the morning, before he had breakfast, his pharynx was cocainized, then his larynx. A hypodermic injection of three-eighths of a grain of morphin sulphate was also given. Then I passed a medium sized tube into the trachea to the first bifurcation. Through this I passed the extension tube to the second bifurcation in the left lung. The mucosa was much congested and swollen. When the second bifurcation was reached we could see rhythmic contractions taking place in the bronchus, almost closing it. After permitting the nurses and doctors around me to see this unusual sight, I withdrew the extension tube, leaving the outer tube in place at the first bifurcation, and through it I injected one gram of a two per cent solution of cocain in a 1:2000 solution of epinephrin, using a long tracheal syringe. This was deposited at the first birfucation in order to facilitate its distribution to both lungs. The treatment lasted twenty minutes. The tube was then withdrawn.

The patient experienced great relief, and in due time coughed up a great quantity of secretion. He did well thereafter for twelve days, getting nights of good rest without interruption. He also looked much better. On December 20th he had a very severe attack of spasmodic asthma at night. On December 22nd I again passed the bronchoscope to the first bifurcation and injected about one gram of the same solution as before. Again the secretion was profuse, and again he experienced great relief. To date he has had no return of the asthma. His bronchitis has also disappeared. He has resumed his work, putting in full time. He has gained in weight and strength. His temperature, pulse and respiration are normal. The only inconvenience that he suffered was a soreness in the larynx, which persisted in each instance for three to four days after the introduction of the tube.

This is but one case to report, but it is worth reporting for two reasons: (1) It confirms what has been observed in the comparatively few cases reported—that bronchial asthma can be treated locally through the bronchoscope; and (2) it may cause someone else who hears or reads this paper to try this method with possible great benefit to his or her patient.

The ordinary treatment of bronchial asthma via the alimentary tract permits but very little of the medicine ingested to reach the tracheal tree. Even then the chemistry of the body possibly so transforms the medicine ingested that it is changed into an inert product which will be feeble in action by the time it reaches the bronchi and bronchioles. Inasmuch as spasmodic asthma seems to be a local affection, it would seem to be the scientific procedure to treat desperate cases at least directly through the bronchoscope, as in the cases cited above.

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V.

VACUUM DISEASES OF THE MAXILLARY SINUS.*

By R. C. Lynch, M. D.,

New Orleans.

It is with a good deal of timidity that one presents to this society anything that might be construed as new, and while I am sure that many of you are fully acquainted with the possibilities of such a condition as a vacuum of the maxillary antrum, I have not, after diligent search through the literature, been able to find any reference to the condition other than a supposition, and so far am able to find no case reported.

Sluder, in conjunction with Ewing, before the Ophthalmological Society in 1909, discussing the nasal conditions in frontal headaches, mentions the fact that closure of the infundibulum will alter the air pressure in the frontal sinus sufficiently to produce discomfort varying from heaviness to dull pain, localized sharply in the frontal region. In his thesis presented to this society January 1, 1911, on vacuum nasal headaches with ocular symptoms only, he brings forth the nasal conditions that are found in this class of cases. No reference is made to the antrum as a possible cause of orbital neuralgia, however.

Brawley, writing in the *American Medical Association Journal,* 1907, says: "The frontal sinus and ethmoid cells opening into the infundibulum are the sinuses most often affected. It is almost impossible for this nonsuppurative condition to occur in the antrum, for its opening is at the lower part of the hiatus semilunaris and less likely to be blocked by the middle turbinate, or, if blocked, is opened by the varying turgescence of the turbinate."

Albert H. Andrews, in the *Journal of Ophthalmology and Oto-Laryngology* for March, 1912, refers to a nonsuppurative condition of the antrum, but associates with this free nasal discharge and the presence of more or less fluid in the cavity and of nasal polypi in the middle meatus.

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*Presented as a candidate's thesis to the American Laryngological, Rhinological and Otological Society, December 1, 1912.

The condition I wish to call your attention to is the production of a vacuum in the antrum not depending upon a previous recent inflammation in that cavity, and not associated with any marked nasal lesion, such as active suppuration, polypi or new formation. Truly a nonsuppurative condition and a noninflammatory one, there being no evidences of any inflammatory state in the nose, simply a condition of hyperemia, produced by the negative pressure, and being entirely relieved as soon as complete ventilation of the cavity is established.

That such a condition as a vacuum—even though nature abhors one—can and does exist in the accessory sinuses is attested by Sluder, Andrews, Brawley, and others, and the frequent example of closure of the eustachian tube with the production of a vacuum in the tympanic cavity, was shown long ago by Prof. Politzer. Granting then that this antral cavity is closed by some process in the soft tissues or bone, we have many examples to prove that the confined air will be absorbed in this cavity as it is in the ear.

It is a common experience for the general surgeon to meet with a localized emphysema, and to see the air in the tissues gradually absorbed. Gaillard, basing his opinion on twenty-two carefully observed cases of simple pneumothorax, says they recover in from ten days to two months, the confined air being rapidly absorbed by the healthy pleura. These absolute facts will leave no doubt in your mind as to the probability of the existence of a vacuum in the antrum, if the only means of ventilation of the cavity, namely, through the natural or accessory opening, is closed by some pathologic change, and the confined air absorbed by the processes referred to above.

While this closure may be accomplished by an acute tissue reaction to some invading infection, and may thus account for the headache that accompanies these conditions, the cases that form the basis for this article are all of the chronic, long-standing type, and it is upon them I wish to lay particular stress, for they are far more likely to be overlooked in a search for the explanation of the varied symptoms they present.

Of the fourteen cases that have occurred in my practice in the last eighteen months, I was unable to find any gross nasal lesion that would lead to an examination of the antrum. In two there was a malposition of the middle turbinate, with a high deflected septum; the two others were incident to an atrophic fetid rhinitis.

It is possible that the hyperplastic changes described by Uffenorde and Skillern and others might easily extend sufficiently far down the nasoantral wall to involve the opening into the antral cavity, or produce some change in the lining membrane by extension through the fibrobony wall, accounting for the closure of normal and accessory openings in this way.

I am quite satisfied that the sinus was absolutely and permanently closed in all my cases, for I was unable to find any evidence at all of there being an opening, after the most careful search with probe, the use of cocain, adrenalin, antipyrin solution, with suction apparatus or the use of the Holmes pharyngoscope; so that whatever might have acted as an exciting factor to bring about this closure had completely disappeared before my examination. These patients all gave a history of a previous attack of rhinitis, but nothing that persisted long enough or seemed serious enough to be looked upon as an exciting factor.

The symptoms, diagnosis and treatment of this condition may best be embodied in the reports of those cases in which the various symptoms were most prominent.

My attention was first attracted to this state by the case of a young lady, nineteen years of age, the daughter of a physician. She was brought to my colleague, Dr. Henry Dickson Bruns, for ophthalmologic examination, suffering intensely from orbital neuralgia. This had persisted for six months continuously, there being no period during which she was free from pain. The most careful physical examinations revealed nothing. Urine, heart, kidneys, liver, lungs and vascular systems were normal. She was nervous from the persisting pain, but not emotional. Eye examination was absolutely normal, as reported by Dr. Bruns, and she was referred to me for nasal examination. A most careful search of the nose revealed nothing. Septum straight, turbinates free, meati and hiatus free, admitting a probe into the frontal and sphenoidal sinuses. But try as I might I could not enter the antrum, even after the use of cocain and adrenalin solution. X-ray and transillumination revealed nothing. No nasal discharge, and no dental tenderness. The antrum was only slightly hypersensitive on pressure near the base of the nasal process of the superior maxilla, as compared to the opposite side. As a last report, I fortunately punctured the antrum with a Douglas trocar, and immediately there was relief. Irrigation revealed only a clear water returning, no pus, no thick mucus, no odor—nothing. I dismissed her, at a loss to know the cause. Later in the evening I saw her from curiosity, and, to my great surprise, found her to be absolutely free from pain. This continued for a week, when she returned with the same pain and discomfort. I made a large opening in the nasoantral wall through the inferior meatus, and again she was well, and has remained so to this day, sixteen months after operation. I could account for this sudden relief from pain, and its recurrence upon the closing of the artificial opening, and the relief again upon making a very large opening, only by the production of a vacuum in the cavity, the restoration of normal air pressure being sufficient to produce cure.

Case 2.—A young married woman, who had been treated by Dr. de Roaldes some years previous, came to me suffering from what was supposed to be hay fever, this, the first attack, coming in August. She gave an absolutely negative history, and an examination of the record of her previous visit showed an intumescent rhinitis, galvanocautery producing complete relief. In the early spring she remembered having a slight cold, otherwise nothing that could account for the sneezing. While the sneezing attacks were paroxysmal, she complained of a certain sensation of constant tickling in the nose on the right side, and said she would sneeze while in bed at night, just as much as during the day. She was nervous and somewhat pale because of this irritation, but otherwise suffered no pain. Nose was particularly free from pathologic change; there was no especial pallor or edema of the mucous membrane, no nasal blocking. Middle turbinate free, meatus free. Cocain, adrenalin and antipyrin application produced no subsidence in the irritation, and transillumination was perfectly clear. I could not enter the antrum with a small probe, though the other sinuses were free and easily probed. With a Holmes pharyngoscope I could see the greater part of the middle meatus, but I could see no point that might suggest an antral opening. The voice was flat and the sneezing or nasal reflex was absolutley confined to the right side, the left nostril being normal in every way. I had no difficulty in entering the antrum of the left side, and this fact made me puncture the right cavity through the inferior meatus. Wash water perfectly clear. She experienced some instant relief, but was affected by the cocain, and I was inclined to accept this as the cause of her relief, especially since the washing showed nothing abnormal. By telephone later she said: "I don't know what you have done to me, but I am perfectly well and won't come down any more." About three weeks later she did return, suffering from the same symptoms, calling my attention particularly to the change in her voice. This time I made a large opening in the inferior meatus with trocar of my own design, and enlarged this opening still more with a Good raspatory and a Grunwald forceps. She still continues well and is perfectly willing to come occasionally to be sure the opening is patulous.

Case 3.—A man, about thirty-five years old, married, father of two children, both well and in good health, was sent to me because of persistent cough and continual facial neuralgia. Both he and his physician concluded that the neuralgia was the result of the cough, though careful physical examination could not account for either. His neuralgia was left-sided, and he said his cough felt as though it came from somewhere in the left side of his throat. He had, some ten years before, been treated for a nasal condition, remembering that a bone or something had been removed from his nose. He was not subject to cold and had not thought of his nose as a possible cause.

Nasal examination showed a slight high septal deflection to the left side, middle turbinate not making pressure on septum, and middle meatus free from secretion. Cocain, adrenalin and antipyrin failed to give any relief. Frontal and sphenoidal sinuses open, but I was unable to enter the antrum. I could not make a satisfactory examination with the Holmes pharyngoscope, but could see where a spur had been removed at some previous time. Suspicious of a vacuum condition, I used a suction apparatus, endeavoring to gain more information, though I could withdraw no fluid from the antrum. X-ray and transillumination added no more information. Teeth were not tender, but region of nasoantral wall seemed slightly hypersensitive by comparison. Epipharynx, tonsils, hypopharynx, larynx and trachea showed nothing that would explain cough or neuralgia. He was referred, however, to Dr. Bruns for ophthalmologic examination, who reported nothing but slight error of refraction, which was properly corrected by glasses then in use. I could see nothing to account for his symptoms, except probably a vacuum antrum condition, and accordingly made a large opening into this cavity. Again I was surprised to note the almost immediate cessation of pain and cough, and he is still free from all recurrence of his distressing symptoms.

Case 4.—This patient had a Caldwell-Luc operation performed some five years ago, at the Eye, Ear, Nose and Throat Hospital in New Orleans. He came suffering again with all the symptoms of an antral empyema, and though I have never seen one of these cases recur, I thought this was to be my first experience. I could make no entrance to the affected antrum, however, through either the natural or artificial opening. Feeling sure that there was pus in the cavity, because of the pain referred to, the cavity, the toothache, tenderness, etc., I made a puncture through the inferior meatus and washed out simply clear water. His pain and all discomfort was relieved, however, and I can but conclude that the closure of the artificial opening was the means of producing a vacuum in the operated sinus, and consequently the pain and discomfort were relieved by simple ventilation. I had seen two cases of this class.

Case 5.—A case of atrophic fetid rhinitis had been under my care for a period of about six weeks, when he began to suffer from orbital and dental neuralgia. His was one of the cases of moderate atrophy with large scab formation. I had been using solutions of dionin in increasing strengths. I presumed at first that the absorption from the scabs was the cause of the orbital neuralgia, but this did not explain the pain in the teeth, especially since this was unilateral and the atrophy bilateral. The dionin produced some reaction after each instillation, but seemed only to aggravate the pain, though the scabs were decreasing. Daily visits and perfect nasal cleansing did not influence the pain. Cessation of the dionin produced no alteration of the condition. I was unable to enter the antrum, though all the other sinuses were perfectly patulous. Suction produced no change. Transillumination gave no further information. His dentist could find no cause for the toothache, so I punctured the antrum, with the complete relief of this orbital neuralgia and his toothache. Surely, nothing but this condition could exist, since wash water was clear, and the relief was immediate after puncture and irrigation.

I am rather inclined to think that the dionin produced here a hyperplasia of the nasoantral wall, and that the opening into that cavity, already small, was closed by the thickened hyperplastic change. Since this change has been noticed in other cases treated by this method, it is a perfectly plausible explanation in this instance.

Case 6.—An elderly lady of fifty-eight years was referred to me because of asthma. Her internist had made careful examinations of her organs and had regulated the caloric value of her diet. Medicine, diet and strict regime improved her physically, but her asthmatic attacks occurred as usual. She was referred to me for nasal examination. Nose was perfectly clear, there being a slight simple atrophy of the mucous membrane, but no accumulation of secretions and no deformity of the bony parts. I could see the sphenoidal openings, could probe the frontal sinuses and the left antrum, but the right antrum was closed. She had absolutely no localizing symptoms at all. False teeth of the upper jaw removed the dental source of irritation. Eyes were good and correctly fitted with glasses. General health fair. I cauterized the septum after the method of Francis. This produced absolutely no relief, not even to the then existing paroxysm. After a more careful study I noticed the change of the voice, though clear at times. I decided to open the right antrum. The water returned clear. The symptoms stopped promptly and now she has gained in weight and looks very well indeed.

Pain in the eye in the region of the nasoantral wall or in all of the teeth definitely localized; constant and not relieved by nasal applications of cocain-adrenalin-antipyrin, nor by headache powders; nasal reflex neuroses, as sneezing, asthma, cough, etc.; change in quality of voice to flat (nasal tone); inability to probe cavity when the other side is patulous; these symptoms, especially when unilateral, and coupled with negative nasal findings, negative transillumination and negative X-ray, must lead one to be suspicious of negative pressure condition.

No more pleasing condition can be imagined for the doctor to deal with, for the relief from symptoms that are usually harassing and severe can be obtained so decidedly and remain permanent that both patient and doctor will be more than willing to congratulate themselves upon the result.

VI.

INDICATION FOR THE LABYRINTH OPERATION, WITH REPORT OF EIGHT OPERATIONS AND SIX CASES IN WHICH NO OPERATION WAS PERFORMED.*

By Cullen F. Welty, M. D.,

San Francisco.

In this series of operations my indications for operative procedure were based upon the teaching of the Vienna school of otology, headed by Neumann, Alexander, Frey, Bárány, and Ruttin.

At this time, under certain conditions, a labyrinth operation was recommended when the acoustic or static labyrinth was intact, and many operations were done in such cases, usually with good results. About two years ago the attitude seemed to change in regard to operative indications, and at present the entire labyrinth must be destroyed before an operation is indicated.

In my series of eight cases, four presented complete destruction of the labyrinth, and in four the static labyrinth only was destroyed.

In one case the horizontal canal was opened from the fistula to the vestibule and the cochlea broken off—all the others were operated on by the complete Neumann method. No facial paralysis or other complication resulted, and all recovered. The cases not operated upon assume more importance, it seems to me, because they fulfilled the indications for operation according to either classification.

Case 1.—Female, aged twenty-one years. Had ordinary diseases of childhood. Acute suppurative otitis following scarlet fever at the age of eight years. The discharge continued uninterruptedly for two years. Adenoids were removed and drops used in the ear, which remained perfectly dry for one year. Since that time the ear has discharged more or less.

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*Read before the Pacific Coast Oto-Ophthalmological Society, July 1, 2 and 3, 1913, Portland, Oregon.

Examination.—Weber towards good ear. Schwabach somewhat shortened. Rinné, right ear, positive; slightly shortened bone conduction; left ear, negative; considerably shortened bone conduction; very much shortened air conduction. Right ear, whisper twenty-five feet; left ear, on contact. Acoumeter on contact. Right ear apparently normal. Left ear, caries of the attic wall with a fissure extending into same. Some granulation tissue about this fissure with a tendency to bleed on manipulation with a probe.

January 19, 1905, radical operation with closing by Koerner flap. Posterior wound healed by primary union. On removing the periosteum from the mastoid the bone was of a dark blue color. This was produced by the carious necrotic mass of the mastoid cells. The outside shell of bone was more porous than under normal conditions. The hammer and incus were almost destroyed by caries. There was a fistula posteriorly and below the facial nerve. However, it was curetted as well as possible by the use of straight and curved curettes. I wish to direct particular attention to this lesion, as I consider it wholly responsible for the symptoms that will be recorded later. The wound was dressed every second or third day. The patient complained of so much dizziness, headache and pain on the side of the head that she remained in the hospital for thirty days. I attributed some of the headache to a compound astigmatism, which was partially relieved by the continuous use of her glasses. While in the recumbent position she was not dizzy. When she assumed the erect position she would become very dizzy, and at one time she fell from her chair. This can be accounted for in but two ways: First, injury to the semicircular canals at the time of operation; second, to an infection which most likely took place by way of the fistula which I described before.

Twenty-four hours after operation she was reported by the nurse to be delirious. This happened two or three times in the course of as many days. She complained of headache and soreness about this side of the head, which gradually subsided. When she began to walk, her gait was that of a person with a fractured pelvis. She is a highly sensitive, hysterical woman, and I attributed part of the cerebral manifestations to her mental condition. The fundus was normal.

March 27, 1905. The ear absolutely dry, hearing improved.

May, 1905. Seropus began to discharge from this fistula and continued until September, 1905, at which time I again performed a curettement. The wound was treated antiseptically until November, 1905, when she was again discharged as cured.

Since the recovery from her primary operation she has had no cerebral symptoms of any kind.

March 21, 1906. Complains of intense headache over this side of the head, and dizziness a great deal of the time. The whole of the temporal bone on this side was tender to pressure, and the slightest percussion would elicit excruciating pain. At this time there was a serous discharge from this fistula, which in the course of two weeks disappeared entirely. The cerebral symptoms continued with acute exacerbations, at times so severe as to require morphin. Her pulse repeatedly reached 50, full and strong. She had some vomiting which was probably due to morphin. Examination of the eye, negative. Physical examination, negative.

At repeated consultations operation was recommended by all but one physician, who maintained that the condition was a nervous manifestation.

May 15, 1906. Patient entirely well. Cerebral symptoms entirely gone.

Diagnosis.—Serous meningitis. Infection by way of the fistula to the semicircular canals and the aqueductus vestibuli. This explains the cerebral symptoms that followed the primary operation, as well as those that followed in the later infection. During the first infection the cerebral symptoms were scarcely sufficient to warrant further operative procedure, because they seemed to improve almost daily after the second or third day. However, when we are confronted with cerebral symptoms later, and the only possible source of infection is by this fistulous communication, it must be admitted that it was by this route. Furthermore, the patient had an association of cerebral symptoms such as dizziness, headache and localized pain on the affected side, which is suspicious of cerebral complications, especially when all the mastoid cells have been removed. In the near future it will be considered conservative surgery to open and to explore.

My diagnosis prior to her recovery was different. At thi time I thought she had an extradural abscess or brain abscess.

with a decided leaning for an extradural abscess of the posterior brain fossa, infection by way of the semicircular canals and the aqueductus vestibuli. No doubt the infection traveled this route and was a nonbacterial invasion. I wish also to call attention to the fact that the fistula, which was discovered at the primary operation and which has apparently been responsible for the infection that followed, should have been destroyed entirely, at the sacrifice of the facial nerve, to remove all possibility of subsequent cerebral affection. Or is it better to trust to fortune, as I did in this particular case, and almost lose the patient?

Case 2.—Woman, aged twenty years, stenographer, had discharge from the ear since childhood, and frequent attacks of facial erysipelas, also repeated attacks of vertigo for several years past.

Examination.—No pain or sensitiveness on pressure or percussion; entire destruction of the membranum tympani; small granulation protruding from the attic. Whisper, three inches. Weber to opposite ear, marked adhesive process in the other ear. Rinné, negative. $C,^1$ positive; C, negative; $C,^4$ positive. Watch on bone, positive. Vertigo, positive. Tinnitus, positive. Spontaneous nystagmus, negative. Caloric reaction, positive. Hearing, seven-foot tube, whisper positive.

Operative Findings.—Caries of attic and antrum; dura uncovered to the extent of two thumb nails. Fistula of the oval window with a blackened margin about it, demonstrating that it has existed for a long time; a good sized probe was introduced into the fistula. Neumann plastic; grafts in the usual manner and wound closed.

First day after operation everything satisfactory; second day, some vertigo; third day, vertigo, nystagmus to the opposite side, vomited five times; fourth day, dressing removed; not so much nystagmus; patient vomited twice. Grafts all adherent.

During the four days the patient had no fever; the vertigo and nystagmus disappeared gradually. The patient left the hospital in ten days, well in twenty-eight days.

Observations.—My only careful examination of this patient das made nine months prior to operation. From the examination as made at that time the cochlea and canals were intact, so that a radical ear operation would not have been attended with risk to the patient's life; but when I found a fistula, and an old one at that, I felt sure there would be induced an acute exacerbation of the old labyrinth suppuration. However, the patient made an uninterrupted recovery. This patient should have had an operation on the labyrinth at the time of the ear operation, or no operation at all.

I relate this case in detail to accentuate the importance of repeated examinations, if operation is delayed.

At the time of examination the patient heard whisper at three inches.

If my labyrinth instruments had been accessible, I would have destroyed the labyrinth at once; as they were not, I concluded the operation with a skin graft. The patient made a good recovery, which can be attributed to good luck rather than to modern otology.

Case 3.—Female, aged twelve years. Discharge from ear since infancy; frequent attacks of pain back of the ear; frequent attacks of vertigo. This last attack began three days ago. Acute exacerbation of the chronic suppurative otitis media; pain on whole side of head. Vertigo so severe that when she moved her head she would vomit. She said the pictures seemed to jump on the wall.

Examination.—Painful on this side of the head, and especially so over the mastoid. Marked nystagmus to the opposite side and to the same side. Nystagmus of the third degree. Meatus swollen to such an extent a clear picture of the membrane could not be secured. Weber to the good ear, Schwabach shortened. Watch on bone negative. The hearing test was positive, but not properly made. By the introduction of cold water into the ear we thought the nystagmus was increased. Hot water did not seem to influence it in any way.

The following morning a radical ear operation was done.

Operative Findings.—Large pneumatic mastoid; cholesteatoma; fistula of horizontal canal; facial uncovered just below fistula. Plastic operation completed.

The following day some additional fever. Beginning facial paralysis; headache. Second day, semicomatose; head retracted, neck stiff; meningitis; facial paralysis; absolutely no hearing; no caloric reaction. Advised immediate labyrinth operation, which was refused. Patient continued in this condition for a few days and began to improve. The facial paralysis recovered entirely. The ear continued to discharge; no hearing; no caloric reaction; the rotary test later positive for a destroyed labyrinth. At my first examination I had misinterpreted the findings in regard to hearing and the caloric reaction.

According to all the rules of otology this case should have died of a purulent meningitis. The patient has had no ear symptoms since she left the hospital. The ear continues to discharge.

Case 4.—Female, aged twenty-four years. Acute otitis in both ears for two weeks past, following influen past four days has had fever of 103½°; marked vertigo, nausea and vomiting.

Repeated incision of the drum membrane by family physician.

Examination by myself. Patient suffering great pain; temperature 102½.° Intense pain over the head and especially back of either ear; marked nystagmus to either side, more to the right. Would vomit when she attempted to move about in bed. Meatus on both sides closed by swelling; pus present. Operation on both ears was performed as soon as instruments could be secured.

Operative Findings.—Large pneumatic mastoid on both sides: dura uncovered on both sides in my effort to remove all carious bone. Operation completed.

The following day the temperature dropped to about 100°: not so much vertigo; no vomiting.

On the following day the temperature continued 101°; dressings changed and a wet bichlorid (1/3000) substituted. After four days of this wet dressing the temperature was 99 to 99½.° Very little vertigo. The dressings were made with dry gauze, and in the course of ten days she was about her room. Discharge from the ears stopped in a very short time following operation.

Three weeks following the operation the patient said to me that she did not hear. I could demonstrate with the tuning forks that she could not hear, which was verified by long speaking tube, noise apparatus, etc. Caloric reaction negative. Was free from vertigo in three weeks. The ear continued to discharge for about ten weeks. Undoubtedly this patient had a purulent labyrinthitis, which for some reason recovered in spite of her physician.

I neglected to make a more thorough examination because the apparatus for examination was not at hand, and I felt that I could not put off operation to make a more thorough examination.

Case 5.—Male, aged seventeen years. Discharge from both ears since he was three years of age, following scarlet fever. This illness also destroyed his hearing. This case had the radical ear operation in 1907 on both ears, neither one of which recovered, but continued to discharge pus. At this time I was not familiar with the findings of the labyrinth in chronic suppurative otitis cases of deafmutes.

Three years later a labyrinth operation was necessary on the left ear because of such symptoms that called for immediate action. This ear is now well and has remained so since the labyrinth operation.

The right ear has discharged off and on, four or five times a year for four to six weeks. Treatment with antiseptics relieves the condition. No hearing at all; caloric reaction, negative; turning has no effect whatsoever.

It is readily understood how some of these cases are misinterpreted. Some were overlooked because of lack of the proper way of arriving at a definite conclusion, and others were not subjected to the proper examination because it was almost impossible to make it under existing conditions. However, the patients recovered, which is most astounding to me, a believer in the Vienna school of otology and its teachings; at the same time I am more skeptical than I was as to the serious nature of the labyrinth infection, and that meningitis usually goes by the route of the labyrinth.

On the other hand, only two of the six cases are free from discharge, and they may at any time have a labyrinth affection or an infection of the meninges by way of the labyrinth with sudden serious complications.

The four cases that had remnants of hearing or a slight reaction following the use of cold water are all cured and out of danger. This speaks for the more thorough operation.

I am of the opinion that the pendulum will swing back again and include as favorable for labyrinth operation such cases as have only remnants of hearing on the one side, and no caloric reaction, or vice versa; so long as they remain in the present stage, they occupy the same position in surgery as a chronic appendicitis.

Does it not seem obvious that this is rather a dangerous condition to allow? They do not get well of themselves, and only progress to a more serious complication as time goes on.

The more I reason with myself the more I am convinced that surgical interference in the cases spoken of will yield the best good for the greatest number.

In regard to my reported cases, in the light of modern otology, they should not have recovered. I cannot reconcile myself to the fact that they survived. However, my leanings are strongly towards operation.

VII.

WHEN THE RADICAL MASTOID IS IMPERATIVE.*

By J. Clarence Sharp, M. D.,

New York.

It is now nearly twenty years since the first radical operation was performed for chronic middle ear suppuration. During this time great advances have been made in otology. By operation we are now able to cure many of those old middle ear suppurations, prevent the development of complications, and also to treat brain abscess due to otitic origin. The modern radical mastoid operation means the complete obliteration of all diseased bone, the throwing into one large cavity of the middle ear, aditus, antrum and mastoid cells, thereby giving the patient a chance to recover from a chronic suppuration. The imperative indications are:

1. Caries or necrosis of the petrosa during the course of a chronic middle ear suppuration.
2. Cholesteatoma.
3. Intracranial complications occurring during chronic suppurative otitis media.
4. Whenever during the course of a chronic tympanic suppuration an acute exacerbation with mastoiditis occurs.
5. Labyrinthine symptoms.

Caries and necrosis follow the destruction of the mucous membrane. This is true, whether the disease at first was a simple acute catarrhal trouble, or purulent from the beginning. As a result of this we have an inflammation of the periosteum, with death of the bone. This is because the nutrient arteries of the bone and the vessels supplying the periosteum rapidly obstruct the circulation. Depending upon the occluded vessels for nourishment, the periosteum or the whole bone becomes necrosed, when it is either eburnized or eroded by the surrounding pus. Any profuse discharge from the meatus which has existed several months must come from the middle ear, and it goes without saying that the drum membrane is either perforated or destroyed. It is very important in what part of the membrane the perforation is. If it exists in the superior and posterior quadrant, it generally means that caries of the incus has occurred, granulations will form, closing off drainage from the aditus. This causes the pus to find its way into the pneumatic spaces, setting up a periostitis with more or less destruction of bone. If we have along with this cholesteatoma, the danger is increased, because the pressure from the growing mass may cause the absorption of the roof of the antrum, the bone in the posterior fossa, or the capsule of the semicircular canals, thereby causing an epidural abscess. a diffuse meningitis, a brain abscess, a sinus thrombosis or an inflammation of the membranous labyrinth. In three cases which I operated upon last year, all three of the semicircular canals were distinctly outlined; in two of them the facial nerve was also exposed, and one had a fistula of the horizontal canal. All this was brought about by the absorption of the bony covering, caused by pressure from the cholesteatoma. We feel that in all cases of chronic suppuration of the middle ear, when cholesteatoma is positive, a radical operation is necessary to save the patient from a further extension of the disease.

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Primary tuberculosis of the ear is more often met with in poorly nourished and bottle fed babies. It is generally located first in the mastoid cells. The infection probably comes through the blood, or by way of the mucous membrane of the eustachian tubes. It comes on with very little pain and runs such a rapid course that palliative treatment is of little use. In order to save the life of the patient a radical operation must be done.

In regard to secondary tubercular infection of the middle ear, this develops most frequently in patients with pulmonary tuberculosis, and seldom with tuberculosis in any other part of the body. It comes on gradually and with little pain, yet the destruction is very great. The wall of the tympanic cavity and antrum resemble macerated bone, the labyrinthine capsule becomes necrosed, and by this means the life of the patient is placed in greater danger. If the patient is not in the advanced stage of tuberculosis, a radical operation should be done as the only chance of stopping a necrosis and preventing development either of a suppuration of the labyrinth or a tubercular meningitis.

Of all the sinuses the sigmoid is the one most often affected by the purulent suppurations. We may have here a perisinus abscess that will give no symptoms, and then we may have only a small opening over the sinus plate, which, not giving good drainage, retains the secretions. This produces an inflammation of the sinus wall, with high temperature. As the inflammation continues we have the formation of thrombi which extend often to the bulb of the internal jugular, causing pyemia and death, if not operated upon in time. We may have, either alone or with a sinus thrombosis, an extradural abscess, which is found either on the dura covering the middle or posterior fossa. In the majority of cases it is caused by the direct exetusion of the inflammation through the bone. The only treatment one can think of in such cases, when it is due to an old chronic ear suppuration, is radical operation and then the opening of the abscess.

Meningitis of otitic origin develops either after the formation of a fistula or from the inflamed external surface of the dura. It is a well-known fact that the dura is very resistant. If it were not so, we would more often have not only acute meningitis due to infection, but also to traumatism. The clinical picture of meningitis is not always the same, and often very difficult to diagnose from an epidural or brain abscess. As a rule, the disease begins with headaches, which are at first remittent, but in time spread over the entire head and become continuous. The patient may have continuous vomiting, sleeplessness and sensitiveness to noises. Lightly tapping the muscles calls forth an active reflex. The most prominent symptom which distinguishes this affection from all the other intracranial complications, and especially brain abscess, is the marked excitement which is made evident by screaming, springing from bed, trying to run away, picking at the bedclothes, etc. The course of otitic meningitis, whether due to acute or chronic middle ear suppuration, is a very rapid one, especially in children. If fluid from a lumbar puncture is cloudy, it points either to a purulent meningitis, a superficial brain abscess, or pus in the ventricles. The absence of coagulation fibrin in a clear fluid points to a serous meningitis. A meningitis may be diagnosed early in its course by means of the biochemic tests of the cerebrospinal fluid, as described by Kopetzky. Otitic meningitis runs, with few exceptions, a fatal course. In circumscribed meningitis, when it is caused by an epidural abscess, a cure is not out of question if the source of infection is removed by operation.

Brain abscess due to otitic origin is very difficult and often impossible to diagnose. The difficulties presented by the differential diagnosis between brain abscess and the different forms of meningitis are apparent from the observation of patients during life, and by the condition of the brain found at postmortem examination. In a number of cases one is able to make a diagnosis of abscess in the temporal lobe by the aid of certain marked symptoms, such as aphasia associated with a localized headache in the parietal region, tenderness on percussion, and increased temperature in the affected half of the skull. The prognosis of brain abscess until within the last few years has been very unfavorable. If the diagnosis is made in time, all the dead bone which was the source of infection is removed, and the abscess opened, before the appearance of serious complications, it is often possible to obtain a cure in a number of cases.

That facial paralysis is not of more frequent occurrence in chronic otitis is no doubt due to the greater resistance of the bony canal, and to its having a separate blood supply. When we do have a facial paralysis complicating an old chronic middle ear suppuration, it is generally caused by necrosis due to cholesteatoma, and should be operated upon at once.

Of the chronic middle ear conditions, cholesteatoma no doubt causes most of the labyrinthine infections. Next in frequency is tuberculosis, and then scarlet fever. Before doing a radical mastoid, when no labyrinthine symptoms appear, a careful functional test should be made, in case the patient after operation should develop any signs of a labyrinthine inflammation. When we have labyrinthine complications, the infection reaches the labyrinth by way of the oval window, round window, fistula of one of the semicircular canals, generally the horizontal, or a fistula of the promontory.

When labyrinthine symptoms do appear, such as nystagmus, vertigo, vomiting, fear of going up or down stairs, with a tendency to fall to the side of the diseased ear, a careful examination should be made with the functional tests in order to decide whether a radical operation should be performed alone, or whether it is necessary to follow the radical operation by a labyrinthine operation.

VIII.

A NEW ESOPHAGOSCOPE.*

By Richard Lewisohn, M. D.,

New York City.

I presume that you may consider it somewhat unusual for a general surgeon to present before your meeting a new instrument for throat work. I have been interested for a number of years in the clinical and surgical aspects of diseases of the esophagus, and especially cancer. You know that diseases of the esophagus, since the introduction of the Sauerbruch chamber, are amenable to surgical interference. It is true, up to a few months ago all cases of resection of the esophagus for cancer have ended fatally. However, all the work done in Europe and in this country along these lines has not been in vain, and has, after many years of disappointing efforts, resulted in the first successful resection of an intrathoracic esophageal cancer by Dr. Torek in New York. To further the work in this special field, to be able to make the diagnosis of esophageal cancer in its very early stages, we need an instrument for examination which can be easily introduced without general anesthesia and without great discomfort to the patient.

The new instrument which I am going to present to you now was not constructed for those who have mastered the use of the straight tube. But I think, even in this audience of specialists, quite a number of you will agree with me upon the difficulties of the straight tube method, and therefore may be interested in seeing an instrument which simplifies esophagoscopy materially.

The new instrument was so constructed that it adapts itself to two main requirements: 1, the introduction is possible in the normal position of the head; and 2, the instrument is passed down in the longitudinal axis of the esophagus, and not at an angle to this axis. In regard to the first requirement, the position of the patient during the introduction of the straight tube is a very uncomfortable one. We do not take into consideration the right angle normally existing between mouth and esophagus, but we try by hyperextending the head to convert this right angle as far as possible into a straight line. This procedure means a great discomfort to the patient. Why should we, however, adapt the patient to the instrument? I think it is much more logical to adapt your instrument to the patient, and in constructing my instrument I laid great stress on the point that during the whole examination the patient sits in normal position.

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As to the second requirement, even if we hyperextend the head as far as possible, we do not convert the axis of the mouth and the axis of the esophagus into a straight line. Consequently, the straight instrument does not pass down in the longitudinal axis of the esophagus, but at a more or less obtuse angle. This is the reason why in a good many cases the passing down of the tube into the deeper parts of the esophagus is a difficult procedure. To overcome this difficulty I had to apply a new principle for the construction of the new model—the telescopic principle. By giving the esophagoscope a telescopic form, it is made possible to introduce the tube exactly in the longitudinal axis of the esophagus. Consequently, there is no pulling on the attachments of the esophagus and, therefore, comparatively very little discomfort and danger to the patient.

I shall try to be as brief as possible in describing the instrument. The instrument is rectangular and carries a mirror at the junction of the two arms for the purpose of light reflection. The horizontal part, which lies in the mouth, presents at its proximal end an illuminating arrangement somewhat like Brüning's. The telescope consists of six tubes, the diameter of which ranges from 10.5 to 15.5 millimeters. A long spring is soldered to the innermost tube, and with the aid of this spring it is possible to open the telescope to any required length and to close it after the examination is finished. A few small pins attached to the upper end of the tubes prevent this spring from protruding into the field of vision.

The uppermost tube presents at its lower circumference two metal guides which are of the greatest importance for the practical use of the instrument. These guides, which act as a kind of obturator, open the mouth of the esophagus automatically.

This leads us to the method of introduction of the esophagoscope. The patient sits in front of the doctor on a chair. You then ask the patient to bend his head slightly backward, and, depressing the patient's tongue with the left index finger, the instrument is introduced blindly. As I said, the instrument glides in automatically and anchors itself in the esophagus. As soon as that is done the patient puts his head forward into the normal position, which he maintains during the rest of the examination. You then push down your spring under the guidance of the eye and so open the telescope. After the examination is finished, you pull on the spring, close the telescope, and remove the instrument.

The mucus is aspirated through a rubber tube carried down to the bottom of the telescope. In order to give the tube its proper bend at the right angular junction of the instrument, it is guided through a metal tube with a kind of Albarran finger attachment. Experiments for the construction of a forceps are still under way. They have so far advanced that I feel assured of the possibility of constructing a forceps useful in every respect for this instrument.

I shall not take up your time with a detailed report of cases. Most of these cases examined I reported last year in detail in the *Annals of Surgery*. The view, inverted but not reversed, is a very good one. Dr. Chevalier Jackson, whose opinion in these matters is certainly authoritative, was kind enough to say at the recent International Congress in London, that in looking through my esophagoscope he had as good a view as he ever obtained through any esophagoscopic tube.

The comparative merits of this telescope and the straight tube can be decided upon only after my instrument has been in the hands of the profession for some time. The disadvantage of its complexity is to my mind fully compensated by the fact that its introduction causes much less discomfort to the patient, and owing to its construction it is connected with much less risk.

I have accepted the invitation of your president to report to you about this new model with the greatest pleasure, and hope that some of you will give this instrument a trial. I feel assured that the telescopic esophagoscope, though not meant to supplant the straight tube, will have a wide field of usefulness in esophagoscopic work.

IX.

A CASE OF CEREBELLAR ABSCESS WITH ATYPICAL SYMPTOMS—RECOVERY.

By Adair Dighton, F. R. C. S.,

Liverpool.

The following case, which recently came under my care at the Eye and Ear Infirmary, presents so many unusual points that I think it is worthy of record:

Mrs. T., aged thirty years, was admitted to hospital on May 7th, with a diagnosis of subacute mastoiditis on the left side. Temperature, 98° ; pulse, 100. A history of six months' discharge was obtained, and upon examination a large perforation was found to occupy the position of the center of the left tympanic membrane. There was no nystagmus, the fistula test was negative, and the labyrinth reacted normally to the caloric test. As there was a lot of pain and tenderness around the mastoid process, and the superior wall of the auditory canal was sagging, I operated on the following day by Heath's method, and found a small sized mastoid antrum full of débris and situated high up. There was nothing whatever unusual noticed at the operation. The same evening the temperature rose to 103° ; pulse, 92. This I thought was probably an operation temperature and took little heed of it. On the following day the temperature remained the same, also the pulse, and I ordered calomel, etc., to try and bring it down. Nothing had any effect, and on the sixth day after operation the temperature and pulse remained the same; there was no vomiting, no optic neuritis, no nystagmus, in fact, no symptom whatever except the temperature and pulse. The patient was in very bad condition, and it was evident that something would have to be done shortly. On the next day (the seventh after operation) a very faint nystagmus appeared, directed towards the left, the diseased, ear. I immediately tested the pointing-by test, and found that though the right hand reacted normally, the left hand persisted in pointing-by to the left. This was the first sign of cerebellar abscess that had been present, and upon it I decided to operate again. This I did, and found an abscess occupying the left lateral lobe of the cerebellum immediately behind the ear. On microscopic examination this proved to be due to the pneumococcus in conjunction with a bipolar staining diphtheroid bacillus (Virol Research Laboratory). The patient made an uneventful recovery except for a slight attack of pleurisy, which immediately subsided under pneumoccoccic serum.

Now, the first point of interest in this case was the rapid rise of temperature, which, as the later history of the case proved, must have been due to the lighting up of a latent cerebellar abscess by the trauma of the mastoid operation. Spencer, of Colorado, in the *Annals of Otology* for June, 1912, reports a somewhat similar case of his own, and mentions a case of latent cerebellar abscess reported by Beck, which lighted up after a mastoid operation. These cases seem to me to point to a moral, and the moral is that we should avoid all trauma as much as possible in the mastoid operation. Of course, the ideal method is that of Lake, who uses hand gouges without a mallet; but there are some of us who cannot get on with these, and for us the moral must be that of Allport, who, writing in the *Annals* for June, 1911, makes a plea for the more careful sharpening of chisels.

The next point of interest was the lack of all the recognized symptoms of cerebellar abscess. The temperature was more like a meningitis, the pulse was not slowed, there was no optic neuritis, no vomiting, and if a faint nystagmus had not been seen, one would have almost been tempted to fall in with the latest invention of the physicians and call the case one of serous meningitis, whatever that may mean.

Lastly, and again referring to Spencer's paper, the characters of the abscess, in this case, agreed with those described by Spencer and Neumann as to the bacillary origin, and from examination it could be seen that the cavity was enclosed in a dense capsule.

I omitted to mention that the cerebrospinal fluid reduced Benedict's reagent before the second operation.

X.

BRONCHIAL ASTHMA AND THE RELATION OF NASAL CONDITIONS TO IT.

By W. J. Abbott, M. B.,

Cleveland.

The pathology and etiology of bronchial asthma are subjects which have been before the profession for many years. The earlier authors considered asthma as comprising all forms of dyspnea with wheezing; thus the dyspnea in cases of cardiac and pulmonary diseases, as also those due to conditions of the pleura and greater vessels, were included under one term. These various causes meant a series of subdivisions which varied according to the conceptions of the cause, seat and nature of the trouble. In 1682 Willis described the nervous character of some cases, and called attention to those conditions in which there was a spasmodic action of the muscles and nerves of respiration, calling the condition asthma convulsivum. With the advance in methods of physical diagnosis and the discoveries of Auenbrugger and Laennec, asthma became a more limited term, and it was shown that it was generally a symptom of some organic disease; and some authorities, particularly those of the French school, advanced the belief that there was no such disease as asthma. This latter idea was shown afterwards to be extreme, as at autopsies no organic disease could be found. Early in the nineteenth century Traube advanced his "fluxionary theory" as being the true explanation of the condition. Then for years this and the "spasm theory" held sway in various forms and combinations.

After these theories had been advanced and supported from evidence gathered at bedside and pathologic work, Reiseisen came to the support of the latter by the discovery of smooth muscular fibers in the bronchial walls. He traced them down even into the very small tubes. Kolliker supported this by demonstrating them also in the bronchioles of 0.18 mm. diameter. Williams demonstrated that these could be made to contract by irritating the lung, and Longet subsequently found that they contracted by galvanizing the pneumogastric nerve. Romberg was a strong supporter of the spasmodic character of asthma, and Bergson in an essay in 1840 accepted the same idea. A valuable article by Hyde Salter, in which he also accepted the spasmodic theory, appeared in 1850. By this time the nervous element in this condition was coming before the students of the subject. In 1854 Wintrich, working with apparatus not very satisfactory, could not demonstrate the contraction of the bronchial muscle fibers, as first advanced by Williams and Longet, but Paul Bert in 1870, with better apparatus, confirmed their original work. Biermer follows as a strong advocate of the old spasm theory, and states his belief in a fluxion which is caused by the action of an irritant upon the exposed mucous membranes. The action of the irritant is explained by Riegel to be possible in three different ways; that is, it may cause spasm and fluxion, it may cause a catarrh which causes the spasm, or it may cause the spasm which causes the catarrh. Lebert, although accepting the idea of bronchial spasm, does not find it sufficient to cause the great inflation of the lungs, hence he adds that it must cause secondary spasmodic contractions of the diaphragm and of the respiratory muscles of the neck and chest. This meets its first opposition by Weber, who in 1872 revives Traube's fluxionary theory. He states that the condition is caused by the sudden swelling of the bronchial mucous membrane, due to the dilatations of its blood vessels through action of the vasomotor nerves, and in proof quotes von Loven's experiments, which show that the irritation of the sensory nerves is followed by a reflex engorgement in the region to which they are distributed. He also refers to the difficulty of nasal breathing which is often seen before and may continue through an asthmatic attack. This was also believed in by Stoerk, who had demonstrated the swelling of the mucous membrane of the trachea down to the bifurcation in these cases.

Up to this time the discussion seemed to be mostly centered on the question of what pathologic conditions existed to account for the attack, as it seemed to be pretty well accepted that the primary cause was a nervous one, the stimuli coming either from remote organs and acting reflexly, or from the respiratory center in the medulla, or from the nerve in any part of its course. These latter two might be seen in cases of toxic conditions caused by lead, mercury, syphilis or malaria.

In 1877 Voltolini called the attention of the profession to the possibility of at least one cause being found in the nose, when he reported his case in which the removal of nasal polypi was followed by a disappearance of the asthma, only to return with the reappearance of the polypi. Similar cases were reported by Daly, Roe, Allen, Hack, Woakes, and others. It is interesting to note here the connection that was brought out between hay asthma (hay fever) and bronchial asthma, although Salter had insisted in 1850 that these two were merely stages of the one condition. The nasal conditions that were found in these were very similar, and the regions known as the "sneeze areas" and "cough areas," described by Francis and McKenzie, practically coincided.

From that time on the problem in asthma seemed to be to find the organ that was causing the irritation. In the event of no irritating condition being found, the asthmatic attack and the patient's general condition, with special attention to the nervous system, gave the indications for treatment.

A great deal of evidence has been produced, particularly in the last ten years, to prove the importance and frequency of conditions in the upper respiratory tract. This has tended to place more importance on the reflex theories and less on the theory of stimulation arising in the nervous system. The theories to account for the bronchostenosis are two, namely: swelling of the bronchial mucous or submucous tissues, due to vasomotor disturbances; and contraction of the finest bronchial tubes, due to a tonic contraction of the muscle fibers. The work done by Einthoven and that of Brodie and Dixon show that stimulation of the peripheral ends of the pneumogastric nerves causes a stenosis of the bronchial tubes, due to a contraction of the muscles fibers and not to any change in circulation. The work of Gay and Southard and of Auer and Lewis, confirmed by Anderson and Schultz, Biedl and Kraus and others, bring out the similarity in lung conditions in cases of anaphylactic poisoning and those in asthma, and prove that the changes in the lungs can occur when the central nervous system is cut off, as for example by curare, or when it is totally destroyed This would mean that the nervous symptoms are not the predisposing fact that was previously felt to be necessary, but are rather a result of the toxic condition, or are caused by the strain and anxiety that would generally accompany any such severe attack.

The importance of this work and the light that it throws on the problem in asthma was brought out by Meltzer, who advanced this as the most satisfactory explanation of the facts which before have conflicted with any other theories. It offers an explanation of the pathologic changes and of the modus operandi of the asthmatic attack, showing how we may account for the swelling of the mucous or submucous tissues of the bronchi, as well as account for the bronchial spasm with the accompanying emphysema and the enlargement of the bronchial lymph glands (first demonstrated by Williams and Bremier in 1870, and recently found in radiographs of chests of asthmatic cases and offered as an explanation in some at least of the cases of bronchostenosis). The changes in the bronchial mucous membrane that are revealed by the bronchoscope in cases where the history has extended over some time might also be explained by the local changes which would naturally follow the congestion and swelling of the lining bronchial membrane and the irritation from which it suffers on account of the dyspnea. The presence of blood-stained secretion which is found in some cases would suggest breaks in the mucous membrane which might well continue to provoke trouble after the subsidence of the original cause, and would show why the treatments through the bronchoscope may be advisable or necessary after the primary cause has been removed. This explanation necessarily presupposes a peripheral cause for the trouble, and it is for the purpose of trying to lessen the field of possible causes that this paper is written.

It will be noticed that the literature since Voltolini's classic case of nasal polypi has been dealing generally with the various causes that might be found in the upper respiratory tract. These have gone through the field of pathologic conditions that might appear in the nose or nasopharynx, but the cases have varied so much that one feels at a loss when trying to get any clear understanding of the real cause unless the reflex theory is still tenable. However, it will be noticed that hypertrophic rhinitis, nasal polypi and ethmoiditis has been mentioned as the most frequent causes, although recently the cases of deviations of the septum have been mentioned more often than previously. There is a question as to whether all of the given causes may not be related or in some way connected, that one condition could be found which would account for all or most of the cases. It may be well to call attention to the fact that recently many rhinologic authorities agree that all polypoid degeneration, especially if around the ethmoid bone, is due to ethmoiditis—or to quote MacDonald: "Recent authorities, St. Clair Thompson, Lack, Parker and Luc, agree in this view, and probably it is now generally accepted." This is the one condition that the writer feels may be caused by any of the other conditions that have been advanced as a nasal condition which might cause an attack of bronchial asthma, and the results of treatments or operations have tended to demonstrate the truth of this hypothesis. Conditions of empyema of the frontal, sphenoid or maxillary sinuses may cause a hypertrophy of the middle tubinate body—or let us say an ethmoiditis, as it has previously shown that they are probably the same. The same is also true of cases of adenoids, deviations of the nasal septum, or even of hypertrophies of the inferior turbinate body. This would solve one problem that has annoyed the rhinologist and has led even him to presuppose a neurotic condition as being an essential to asthma, and that problem has been to explain why so many cases of empyemata of the sinuses, adenoids or deviations of the septum occur without any asthmatic symptoms.

The writer has had thirty-four cases of bronchial asthma in the past three years in which the subsequent history has been followed sufficiently far to enable some statements to be made about the result. In reviewing these, many problems have presented themselves, some of which might be worth consideration. If the theory that an ethmoiditis is necessary to cause asthma be accepted, then one might wonder if all these ethmoid changes are of equal severity, or what conditions would be found if the condition in the nose falls short of causing an attack, or why in some more severe cases of ethmoiditis, where extensive polypi fill the nasal spaces, there is no asthma apparent. It is in the milder cases that we find an explanation of why we get a persistent, socalled bronchitis in cases of adenoids. Again, after some cases of acute rhinitis, it will be found, as a rule, where there are adenoids and a bronchial cough, that there is also an ethmoiditis, and that the cough will improve just as fast, and no faster, than the improvement in the ethmoiditis. This explains why many cases of cough are improved and some are not, after an adenoid removal has been done. The same might be said of operations for straightening a nasal septum; for if the new condition is sufficient to allow a disappearance of the ethmoiditis by affording drainage, ventilation or whatever has been necessary, then the cough will also disappear in accordance with the progress made by the ethmoiditis. The writer has seen cases of socalled bronchitis clear up with marked rapidity when some adequate treatment has been made to affect the ethmoid condition. It is not to be supposed that all cases of bronchitis are caused by an ethmoiditis, but there are a great series of cases that have been so diagnosed that have resisted the regular treatment for bronchitis where an ethmoiditis does account for the trouble. In these the patient generally complains of a severe and persistent "cold in the head," with coughing spells which are more severe in the night and generally between midnight and four o'clock in the morning.

This question as to why we do not find asthma in all cases of nasal polypi is one for which the writer frankly admits that he can, at present, see no satisfactory explanation. However, it is interesting to note that in some of these cases where no asthma exists, a history of asthma or a persistent bronchitis could be elicited as preceding the first appearance of the catarrh which developed into nasal obstruction; and also in some cases after the removal of the polypi, where the pedicles were not cleared up, that a spasmodic bronchitis or slight attack of asthma has appeared. The history of cases of asthma where any other cause but an ethmoiditis has been given, has in the writer's experience cleared up gradually after the other condition has been removed, and as far as he has observed in his cases there is a parallel improvement in the asthma and the ethmoiditis. On the other hand, where the writer has diagnosed a case as having some other condition, the asthma disappeared at once when the ethmoid condition was removed, regardless of whether the other conditions were removed or not. In one of the writer's cases (a young American woman, aged twenty-six years) there was a slight ethmoiditis with very slight hypertrophy below the left middle turbinate. She had suffered from violent sneezing for about six months (January to June), and at times an annoying cough that had been diagnosed as bronchitis had appeared. After operation the sneezing and bronchitis disappeared and did not bother her until one year later, when the right ethmoid became involved. She would admit no history of asthma, but after a short trip, on which she cought a cold, she had her first attack of asthma. She was seen two days later, when it was observed that her ethmoiditis was worse than when seen before the trip, and she had a slight asthmatic wheeze. After operation these disappeared and no trouble has arisen in the eight months since.

The findings of other men do not seem to be particularly at variance with this conception of the etiology of asthma being a toxic condition, and it is only in the matter of finding the seat of its origin that the paths deviate. For example, the work in idicanuria by Eustis suggests an autointoxication and treatment of the intestinal tract which theoretically ought to assist materially at least, even though we admit an ethmoiditis as the real cause. The work of Carmalt Jones in isolating the bacteria that seem to him to cause the trouble, and his results with vaccine that he prepared in the Wright laboratory, as well as results that have more recently been personally reported to the writer, by injections of mixed infection phylacogen (prepared by Schafer's method), would suggest that something of this kind somewhere in the body were at the bottom of the trouble. The constant findings in the writer's series, regardless of other conditions, seem to point decidedly toward this being the real seat of the trouble. In one case of the series (a Russian, aged thirty-seven years, who had difficulty in breathing, bronchitis and occasionally wheezing, since a child, but had had more trouble in four months before the first examination was made) no hypertrophy of the mucous membrane about the middle turbinate was found, but the bone of the posterior half was enlarged and interfered with nasal breathing. This was removed and then some polypi were found under the turbinate bone far back in the ethmoid region. When these were removed and some of the posterior cells opened, a recovery followed.

The question of what treatment is necessary to insure a satisfactory result is one which entails a very careful examination and careful judgment of the whole condition. The writer feels that it is here that he, as possibly others, has failed, and that the successes of Francis and McKenzie with their light routine cauterization of the sensitive areas are to be explained. Any one who has tried to assist the various conditions of ethmoiditis to a satisfactory recovery will realize the difficulties, as in some cases a light cauterization seems to be all that is indicated, while in others a complete evisceration of the ethmoid—for example, the Ballenger operation—is necessary. Much can be done with a slight operation to provide drainage, if the patient can be seen frequently afterwards for treatments, but generally in cases that cannot be seen—for example, dispensary or out of town cases—a more radical operation is necessary. In the majority of the writer's cases the Uffenorde ethmoid operation has been done. This allows good drainage and opens the spaces to allow of subsequent satisfactory treatment, and interferes with the anatomy of the nose to a much less extent than other operations which involve a removal at least of all of the middle turbinate body.

The other conditions found in this series have been two cases of sphenoid, three cases of maxillary, one case of frontal empyema, one case of adenoids, and six of deviation of the septum that seemed to demand operation. In these, after the first ten cases, as a rule the ethmoid condition, being considered the most important, was generally treated first. In one antrum infection where the symptoms were not very severe, that condition was first treated, with the result that after it was pretty well under control the ethmoid and asthmatic symptoms began to improve. At present there is a case of sphenoidal empyema under observation. She had her ethmoid operation over five months ago, and has been free from asthma ever since, but still has the discharge from the sphenoid sinuses. These I hope to open soon, as the point in the case has been proven.

One might therefore conclude that:

1. Granting asthma as being caused by a toxic anaphylactic dose, at least a very large percentage of cases have a nasal origin.

2. Ethmoiditis is the most constant and probably a necessary condition in the etiology.

3. Other nasal conditions are the cause of the ethmoiditis.

4. Result and lesions in the bronchial tubes may need attention after the correction of the nasal conditions.

5. Any intestinal infection may help to aggravate the condition.

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XI.

A CASE OF RECURRING LARYNGEAL POLYPI WITH TETANY.

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August 22, 1912. Patient, Jacob H., two and one-fourth years old. Patient has been growing slowly more and more hoarse during the past six months. For the past week or ten days has been showing increased dyspnea. Since yesterday breathing has been labored. Cyanosis has been present for several hours.

Examination.—Well-nourished child, lying in its mother's lap, gasping for breath and showing marked cyanosis. Hurried physical examination showed pulse 160 and somewhat irregular, respirations irregular and gasping with great inspiratory dyspnea. Lungs show many small rales both forward and back; no superficial evidence of laryngeal struma.

Hurried tracheotomy.—A low tracheotomy was attempted, but on account of a large thymus this was abandoned in favor of a high operation. Following tracheotomy free respiration was established. The child was a week later transferred to the care of the laryngologist of its home city.

Nine months later the child was seen for the second time. The mother stated that the physician to whom the patient had been referred stated that the child would be obliged to wear the tube for the rest of its life, and that nothing more in the way of an operation would be of service. Consequently the tube had been allowed to remain in position for nine months without being removed, even for the purpose of cleaning.

Examination.—The tube was in position and through it respiration was somewhat labored. The tissues around the tube were naturally reddened and infected, and there was considerable mucopurulent discharge in the wound. Attempted removal of the tube for the purpose of cleaning it was accompanied by brisk hemorrhage. This was stopped with some difficulty and the tube replaced. A day or two later the tube was removed and the trachea was examined through the bronchoscope. Granulation tissue and masses of papillomata were discovered, extending down through the trachea to the level of the lower end of the tube. These masses of tumor were removed and applications of absolute alcohol were made to the masses of tumor which filled the larynx. The child became daily more unmanageable and was discharged temporarily from the hospital still wearing the tube.

July 14, 1913, two months later, the child remaining unmanageable, a thyrotomy was done under ether and the tumor was thoroughly removed. It was discovered at this time that the tumor filled the region at the base of the tongue very completely and extended up over the epiglottis as well as downward to the tracheotomy tube. A scissor dissection was done and the base of the growth cauterized with alcohol. The larynx was then packed with iodoform gauze and the tracheotomy tube reïnserted.

July 24, 1913, ten days later, tracheotomy tube was removed.

July 29, 1913, after having breathed satisfactorily through the mouth for five days, the child suddenly became dyspneic and the tube was replaced by the interne.

August 11, 1913, two weeks later, examination through bronchoscope showed larynx filled with edematous tissue, and a week later patient dicharged, with tracheotomy tube in place.

October 8, 1913, two months later, removal of tracheotomy tube and insertion of intubation tube. With the exception of once, when the patient coughed up the intubation tube, which was replaced by a larger intubation tube, progress of the case was uneventful for over two months.

December 13, 1913, two months later, on account of the fact that respiration through the intubation tube had been free for two months, it was decided to attempt its removal. By means of suspension laryngoscopy the larynx was found to be free of tumor and the tube to be clear. Following removal of the tube, respiration was free for several minutes only, after which edema following release of pressure closed the larynx. The child was replaced on the suspension apparatus and the intubation tube reinserted. The patient breathed perfectly for some minutes, after which the masses of edematous mucous membrane covered the top of the tube, on which account the necessity of replacing the tracheotomy tube was apparent. This was done.

December 13, 1913, five hours later, after having reacted well from the anesthetic, the child complained of being cold and developed a tremor of the hands, arms and face, resembling a chill. His temperature was 103.8,° pulse 180, respiration 28 to 40, and he was sweating profusely. Within a couple of hours the tremor had developed into clonic convulsions, beginning in the face, with rhythmic opening and closing of the mouth. Immediately the face and arms took part, the thumbs were flexed upon the palms and the fingers flexed over the thumbs, but could be easily opened. Soon the legs became involved, the thighs were flexed upon the abdomen. So severe were some of the convulsions that the bed shook. The patient soon became stuporous. The convulsive seizures became more and more severe and frequent until they were practically continuous. After several hours of practically continuous clonic convulsions, the attacks became rather less severe. Between attacks he appeared totally oblivious to his surroundings, but could be aroused, and calcium lactate, grains six, four times a day, was ordered and gastric lavage was practiced.

December 14, 1913. For hours at a time the convulsions were practically continuous. Following them there were periods during which the child was comparatively quiet. Opisthotonos appeared and became marked. Stupor remained. Temperature, pulse and respiration remained high. Parathyroid extract, grains one, t. i. d.

December 15, 1913. Opisthotonos increased and an erythematous rash appeared over chest and face. The patient throws himself about in bed and usually lies on the left side.

December 16, 1913. Three days after the first tremor was noted, the convulsions lost their clonic character and became distinctly tetanic. From then on the case was plainly one of tetany. Trousseau's symptom, i. e., the production of the attack by compressing the venous trunks, was present though not very prompt. Chvostek's symptom, i. e., the production of twitching by tapping on the facial, could be elicited.

December 26, 1913. For ten days the attack persisted with the greatest severity. The tetanic convulsions were more or less continuous, the opisthotonos was marked, stupor was deep, temperature, pulse and respiration remained high, and the child became gradually weaker, although nourishment was taken rather well. It became apparent that the child was blind or nearly so. The ophthalmoscopic report showed moderate optic neuritis with edema of the retinæ. Convulsions were not noted on the thirteenth day.

From then on the recovery was uneventful. The child gained in strength, vision returned slowly but steadily, until now it is apparently good, although the age of the child makes an accurate estimation impossible. The present condition of the child is satisfactory. He is still wearing the tracheotomy tube, but this will, I think, be removed without trouble in the near future. I had expected to take it out before this, but the mother took the child home temporarily, and is to bring it back again tomorrow.

With this case in mind, it is interesting to note Frankl-Hochwart's classification of tetany, which he divides into the tetany of adults and the tetany of infants.

Tetany of adults:

1. Epidemic tetany, rheumatic tetany, or shoemaker's cramp, sometimes considered as infectious.
2. Tetany of gastric disorders, which is very rare.
3. Tetany following poisoning from chloroform, ergot, lead, etc.
4. Tetany of the acute infectious disorders (typhoid, cholera, influenza).
5. Tetany during pregnancy.
6. Tetany following injury to the parathyroids.
7. Tetany of Basedow's disease, cerebral tumor, cysts of the cerebellum and syringomyelia.

Tetany of children, associated with gastrointestinal disorders, acute infections and rickets.

In the case under discussion we have apparently a severe secondary tetany following so soon after the operation that we must look for the etiologic factor in something associated with the operation. We have, therefore, to consider a toxemia from the ether or an injury to the parathyroids. The former cannot be excluded, although the child has taken the same anesthetic several times before without untoward result. I am not able to understand how the parathyroids could have been injured at the time of operation, although it is possible that a hemorrhage took place in this tissue during some of the manipulation.

XII.

ADENOCARCINOMA OF THE NOSE; CHRONOLOGIC REVIEW AND CASE REPORT.

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Primary carcinoma of the internal nose, of whatever variety, is of much interest, not only because of its rarity, but because of the importance of early diagnosis and radical removal.

Kümmel[1] in 1896 reported that medical literature up to that time furnished but forty cases.

Hopkins[2] in 1897 found in the records to which he had access, twenty-three cases.

Newcomb[3] in 1899 mentions Hopkins' statistics, abstracts four other cases, adds one of his own, a total of twenty-eight cases.

Carter[4] in 1907 had found ninety-eight cases. Since 1907 to date, reports of ninety-two other cases are to be found, showing that the influence of the appeals of the earlier authors as to the reporting of cases has not been in vain.

These two hundred cases of primary intranasal carcinoma, therefore, represent the total upon which conclusions can be based.

Carcinoma of the internal nose exists in many forms. In the order of their frequency[5] they are as follows:

1. Squamous celled.
2. Cylindrical celled.
3. Medullary form.
4. Adenocarcinoma.

Adenocarcinoma may be briefly defined as an adenoma which has undergone carcinomatous development, sections of which show a pernicious proliferation of the glandular cells, showing areas of confusion in their arrangement and resulting in penetration of the basement membrane.

The extreme rarity of this form is evident, for out of two hundred cases of intranasal carcinoma reported, only twenty-one are undoubted cases of this variety.

Because of its close relationship to the benign adenomata and myxomata, adenocarcinoma is of peculiar interest.

There prevails a divergence of opinion among the authorities as to the influence of operative procedure as a causative factor in the transformation of benign growths into malignant.

Thus, Wright[6] states: "Fully aware of the opposing views of many others in this matter, I am compelled to speak from my own experience alone. I have never seen in the nose and throat, where ablations of various growths are often made at repeated and long extended intervals, any evidence of a histologic change in type from the benign to the malignant, in either papillomatous or adenomatous growths."

Finder[7] comes to the conclusion that carcinomata and polypi frequently arise simultaneously, and that pedicled tumors of primitive form (carcinomatous) are clinically undistinguishable.

Citelli and Calamida,[8] on the other hand, believe that adenoma and papilloma frequently become carcinomatous, and quote their own cases in proof. They point also to the well-known fact of such transformation occurring in other parts of the body. They account for the rarity of adenocarcinoma as due to the rarity of adenoma in the nose, and believe that transition can occur and does so rapidly.

In the analysis of the appended cases one is struck with the number of cases in which "polypi" were diagnosed primarily. If the transmutation of benign neoplasms of the adenomatous and papillomatous forms is possible elsewhere in the body, then it is reasonable to suppose that such transformation can and does take place in the nose. Such is the author's belief. Aside from this transformation in nature, the usual causative factors of carcinoma as found elsewhere prevail here.

AUTHOR'S CASE.

M. A. S., aged fifty-five years, born in Ireland; single. March, 1912. Father, alive and well. Mother died, aged fifty years, of obesity. One sister, died of breast cancer at twenty-six years. Three brothers alive and well.

Past History.—Always healthy since childhood, except for occasional attacks of grippe. About a year ago began to have profuse discharge from right nostril, frequently using as many as twenty handkerchiefs daily; discharge gluey and at times blood streaked. Consulted physicians at dispensary, and had polypi removed at many sittings. In intervals of operations, patient would blow out fleshy masses. Always bled profusely during operations. Obtained much relief in breathing and diminution of discharge until nostril refilled. At no time has she had headache or pain of any kind.

Status Praesens.—Now three months since last operation. Seeks relief for stoppage of right nostril and discharge. Has lost forty pounds in twelve months and feels weak.

Objective Symptoms.—Poorly nourished, flabby, looks older than age given. No glandular enlargement. Right nostril completely occluded. A profuse mucopurulent discharge fills the nostril. On wiping this away, a pale growth, completely filling the naris, is noted. It is lobulated, streaked with blood, boggy, and bleeds readily when probed.

Cocainization and adrenalinization had little effect in reducing the size of the growth. Postnasally a sausage-shaped tumor, pink, pale and shiny, protrudes out of the right nostril, completely filling the chona of that side. It bends across behind the vomer and touches the left eustachian eminence. It partially occludes the left nostril, but interferes but little with respiration on that side.

Transillumination reveals a dark area below right eye and over three-fourths of the internal aspect of the antrum. Right frontal and ethmoid areas dark; left, normal. Exploratory puncture of antrum negative.

Growth probably arises from middle turbinate and adjacent regions. A section was obtained by snaring a portion of the growth through the left nostril.

Examination by Dr. E. E. Smith, who reported section to be adenocarcinoma.

Blood Examination (Dr. Smith).—Hemoglobin, 78 per cent; red corpuscles, 5,190,000; fibrin form, increased. White corpuscles, 12,420. Polymorph. neutrophiles, 71.2 per cent. Large mononuclear, 6.8 per cent. Lymphocytes, 20 per cent. Mast cells, 1 per cent. Eosinophiles, 1 per cent.

Hematologic Diagnoses.—Secondary anemia, slight hyperinosis and high physiologic leucocyte count.

Urine Examination.—Specific gravity, 1.020, strongly acid. Indican, trace. Acetone, trace. Urea, 11.62 grains per fluid ounce. Sugar, small amount. Microscopically urine showed mucus, calcium oxalate, small bladder cells, no casts.

DESCRIPTION OF OPERATION.

Operation, May 14, 1912. With the view of diminishing hemorrhage during operation and of reducing the blood supply to the region of the growth, the right external carotid was ligated just above the facial. An incision was then made, beginning just underneath the inner extremity of the supraorbital ridge and extending downwards midway between the inner canthus of the eye and median line of the face, for about two and one-half inches, the incision being curved in its lower portion outwards beneath the orbit. The periosteum was incised and elevated, separation being completed well back into the orbit. Entrance was gained into the ethmoid region by breaking through the orbital plate of the ethmoid. The orbital plates of the ethmoid and frontal and nasal process of the superior maxilla were removed sufficiently to give an excellent view of the ethmoidal and frontal regions. The frontal was found to be filled with a thick mucoid substance, and its membrane was markedly thickened, but no evidence of extension of the tumor to this region was found.

Both the anterior and posterior ethmoidal regions had been invaded by the growth, and the bone constituting the orbital plate of the ethmoid in its posterior portion was very thin, showing evidence of at least pressure from the growth. The growth filled the entire inferior, middle and superior meati. This growth was removed as far as possible, and the ethmoidal cells thoroughly eradicated, the entire ethmoidal labyrinth being removed. The sphenoid, except for the fact that its membrane was somewhat thickened, presented no evidence of the disease. This wound was packed tightly with iodoform gauze, and an incision was then made over the malar fossa of the superior maxilla, as for a radical antrum. The wall was very thin, and the antral cavity was filled with the growth. The growth presented a soft mass, lobulated, bleeding freely wherever lacerated. It could not be removed en masse, hence was removed in sections. The orbital floor about half way back presented an opening which was judged to be either a dehiscence or the result either of pressure from the growth or of involvement of the bone. This opening was enlarged and all bone which presented evidence of disease was removed. The inner walls and mucous membrane of the entire antrum were involved, but the bone of the floor and posterior walls, as far as could be judged, were not extensively involved. though even after thorough curetting, the floor still had a velvety feel. The entire inner wall of the antrum was removed, including all of the turbinal tissues, the cavity of the antrum thoroughly curetted throughout its entire extent. The cavity was then tightly packed with iodoform gauze. The incision on the face was sutured with silk, no drainage being left in this region. There was markedly little hemorrhage throughout the operation.

Patient made an uneventful recovery and was discharged on the eighth day.

CHRONOLOGIC TABLE.

Year	Reporter	History	Symptoms			Origin	Extension	Diagnosis	Operation		Termination	Autopsy	Remarks
			Obstruction	Discharge	Pain				Primary	Secondary			
1890 (9)	Newman, D.	Male, 47. Chrome worker	Left nostril	Profuse serous; at times bloody	No	Inferior turbinate	Antrum	Adeno-carcinoma	Piece for examination	None	Death	No	
1897 (10)	Hopkins, F. E.	Male, 83. Tubercular family. Nativity not given	Left nostril	Copious mucous	No mention	Not stated	Entire naris	Polypi and myxoma	Rough removal at intervals by general practitioner	No operation because of age	Not stated	No mention	Author believes malignancy due to trauna of incomplete operation
1897 (11)	Saetta.	Female, 60.	Left nostril	No mention	No mention	Uncertain	No mention	Adenoma with carcinomatous degeneration	No details	No details	No details		

1897 (12)	Leland, G. A.	Female, 50. No family history	Right nostril (at night)	Profuse purulent	Right frontal pain	Ethmoid	Orbit septum antrum	Adeno-carcinoma	Piece for diagnosis	None	Death two months	Death from cachexia	
1898 (13)	Thorner, Max.	Male, 47. Farmer, U. S.	Left nostril 1 year	No mention	Moderate	Middle (meatus) turbinate	Left orbit, destruction of eye	Adeno-carcinoma	Removal many times, snare and curette		Death	Cachexia and meningitis	
1899 (14)	Newcomb, J. E.	Female, 61. U. S.. Negative family	Frequent head colds for many years, both	Copious, watery, hemorrhagic and offensive	No	Middle turbinate	Superior maxilla and hard palate	Adeno-carcinoma	Piece for diagnosis	Excision of upper jaw	Death one week after operation	Thrombi of coronary arteries	Author does not believe polypi became malignant
1902 (15)	Polyak.	Female, 66. No history	No details	No details	No details	Ethmoid region	Antrum and behind orbit	Adeno-carcinoma	Local curettage	Removed under ether	Alive when last seen		
1902 (16)	Citelli and Calamida.	Male, 52. Farmer	Right nostril 3 years	Purulent	No	Not stated	Orbit	Adeno-carcinoma	Piece for diagnosis	Refused	?	?	

CHRONOLOGIC TABLE.

Year	Reporter	History	Symptoms			Origin	Extension	Diagnosis	Operation		Termination	Autopsy	Remarks
			Obstruction	Discharge	Pain				Primary	Secondary			
1903 (17)	Page, L. F.	Male, 40. Negative family	Right nostril 3 years	No mention	Frontal headache	Middle turbinate	?	Adeno-carcinoma	Piece for diagnosis	Exenteration middle turbinate and ethmoids	No return		
1903 (18)	Cordes, H.	Female, 75. No history	Right nostril	Copious, bloody	Severe frontal	Not definite	Outer wall	Adeno-carcinoma	Piece for diagnosis	28 applications of cautery	No return after 9 months		Patient had erysipelas; radical operation refused.
1904 (19)	Dudley, Wm. H.	Male, 61. Negative family	Five years left	Purulent from antrum	Moderate	Left ethmoid and sphenoid	Orbit and all sinuses	Polypi adenoma adeno-carcinoma	Removal of polypi	Partial removal through orbital incision	Death after 2 years	All sinuses involved; cranial cavity eroded; no meningitis	Author believes that degeneration of polypi occurred

1905 (20)	McCoy, John.	Male, 47. Family negative	Right nostril	No mention	Frontal	Ethmoid	Frontal sinus, sphenoid and septum	Adeno-carcinoma	Removal and curettage	Modified Killian	No recurrence 1½ years		Author commends mode of operation
1905 (21)	Minor, C. L.	Female, 28. Cancerous family	Left nostril and later right	Profuse	No mention	Middle turbinate	Septum and superior meatus	Polypi and later adenocarcinoma	Repeated removals	Radical curettage	No recurrence 1 year		
1905 (22)	Minor, C. L.	Female, 22. Moderate cancerous history	Both nostrils	Profuse purulent	No mention	Middle turbinate, both	Ethmoid	Polypi and later adenocarcinoma	Removal, two operations	Exenteration middle turbinate and ethmoid	No recurrence 6 months		
1905 (23)	Fiocre.	Female, 63.	No details	No mention	No mention	Middle and inferior turbinate	No mention	Probable sarcoma	Removal, snare and forceps		No return 2 months		

CHRONOLOGIC TABLE.

Year	Reporter	History	Symptoms			Origin	Extension	Diagnosis	Operation		Termination	Autopsy	Remarks
			Obstruction	Discharge	Pain				Primary	Secondary			
1907 (24)	Hurd, Lee M.	Male, 59.	Left nostril	No mention	No mention	Antrum	Entire antrum	Adenoma, later adenocarcinoma	Ligation carotid, removal upper maxilla		No recurrence 1½ years		Author commends ligation of external carotid
1907 (25)	Pusateri.	Male, 60.				Right ethmoid	Antrum						Anatomic specimen
1907 (26)	Harmer and Glass.	1 case.											No history or details

1908 (27)	Klemptner, Louis	Female, 33.	Both nostrils 3 years	No mention	No mention	Right antrum	Ethmoid and middle turbinate	Adenocarcinoma (glandular)	Denker antrum and ethmoid removal		No recurrence 6 months		No details; simply mention
1910 (28)	Gault.	No details.	Right nostril	No mention	No	Middle turbinate	Ethmoid and whole nose	Adenoma (epithelium) adenocarcinoma		Ethmoid and middle turbinate removed	No recurrence 5 months		Details meager
1912 (29)	Alexander, L. D., Jr.	Female, 55. Sister died of cancer. Lost 40 pounds	Right nostril	Copious, gluey and bloody	No	Middle turbinate	Antrum and ethmoid	polypi and adenocarcinoma	Many removals of polypi	Radical removal and carotid ligation	No return 6 months		Case shown at Academy of Medicine

SUMMARY.

Average age	53
Extremes	22-83

SEX.

Male	9
Female	10
Not given	2

SIDE INVOLVED.

Right	7
Left	7
Both	3
Indefinite	4

ORIGIN.

Middle turbinate	13
Antrum	2
Inferior turbinate	1
Uncertain	5

OPERATIONS.

Radical removal	5
Exenteration and curettage	9

TERMINATION.

Death	5
No recurrence	9
Lost sight of	7

Consideration of this summary shows that adenocarcinoma is essentially a disease of the cancerous age; and yet the two cases reported, one of twenty-two and one of thirty-three years, show that an early onset is possible. The influence of sex is negative, as is the side involved.

The predilection for the middle turbinal and ethmoid region, as evidenced in thirteen cases, is significant, in view of the imperfect surgery performed in that region.

Absence of pain, even when extensive involvement of adjoining structures has occurred, is a noticeable fact. The absence of lymphatic involvement is, I believe, more apparent than real. It will be remembered that the nasal lymphatics empty chiefly into a few glands situated around the eustachian tubes, another set placed in front of the cervical vertebra, still another near the cornu of the hyoid bone, while some again empty into the deep cervical lymphatics. The difficulty of palpation of glands situated as above is manifest.

PROGNOSIS.

In estimating the prognosis of adenocarcinoma and the success of the removal by operative procedure, there are several considerations necessary. In the opinions of the authorities, the outlook is most hopeless. Thus Carter states, "that there is no authoritative case on record where recurrence has not taken place after the operation, and often this recurrence has taken place before the patient has left the hospital."

I am unable to refute this statement by the recorded cases above, even though adenocarcinoma is the least malignant variety of all.

Of the nine cases radically operated upon, as given above, one, that of Hurd, had no recurrence in two years, and one, that of McCoy, none in three years. Of the other seven, I am unable to obtain information except as reported.

It is most probable that a future review of this subject will provide better statistics and better results. This will be accomplished by the routine examination of polypoid growths, leading to the early recognition of those showing beginning malignant changes, and the discovering of coexisting pedicled malignant growths. In spite of the meager results as evidenced above, I believe the early diagnosis and extensive and radical operative procedure now practiced will lead to a better prognosis in future cases of this form of growth.

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XIII.

THE SEMICIRCULAR CANALS AND THE FUNCTION OF EQUILIBRIUM.*

By Geo. E. Shambaugh, M. D.,

Chicago.

The semicircular canals have two well-recognized and more or less distinct functions. From these canals we get our sense of turning motions, but in addition the semicircular canals undoubtedly play a very important part in preserving the equilibrium of the body. This it accomplishes through what we designate as tonus impulses, which supply the skeletal muscles and keep them in a constant state of stimulation. To Ewald is due the credit of demonstrating the tonus function of the labyrinth. Various hypotheses have been advanced to account for such tonus impulses. Ewald, for example, believed that the hairs of the hair cells of the cristæ project free in the endolymph, and that they are in a constant state of ciliary motion, which in turn result in constant stimulation of the hair cells and the production of a constant stream of tonus impulses to the various skeletal muscles. This hypothesis of Ewald was, of course, based upon a faulty conception regarding the structure of the end organ in the semicircular canal. The hairs do not project freely in the endolymph, but are covered over by a superimposed structure called the cupula.

Breuer was a student of the anatomy of the labyrinth and understood the relation between cupula and hair cells. Breuer believed that the tonus impulses emanate from the hair cells of the cristæ. His idea of the stimulation of the hair cells was that this stimulation resulted from displacement of the cupula on the crista as the result of impaction of endolymph currents. In order, therefore, to account for the existence of constant tonus impulses, Breuer was forced to assume the existence of constant currents of endolymph. He seemed to have an idea that these endolymph currents could be accounted for from the constant replenishing of endolymph. He believed that the endolymph flowed from the membranous labyrinth directly into spaces containing cerebrospinal fluid. Of course, we know now that there is no communication between the endolymph and the brain cavity, and there seems to be no reason for supposing that constant endolymph currents exist.

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Bárány believed that tonus impulses to the skeletal muscles are derived from tonus centers located in the region of Deiter's nucleus. Two such centers exist: one stimulating the muscles producing motion toward one side, the other stimulating the muscles producing motion toward the opposite side. Now, the tonus of these centers is, according to Bárány, in part automatic, but in part also is kept up from a constant stream of tonus impulses passing to these centers from the vestibular ganglion, located in the meatus acusticus internus. The tonus of this ganglion is in turn kept up by impulses emanating from the hair cells of the cristæ. What keeps up the constant stimulation of the hair cells to supply this tonus Bárány does not suggest.

My own conception of the origin of labyrinth tonus is that these impulses emanate from the hair cells of the cristæ and that they are the result of a constant stimulation. Now, the normal stimulation of the hair cells of the cristæ is brought about by the impaction of endolymph currents against the cupula, resulting in an interaction between the cupula and the hairs of the hair cells. I am inclined to believe that this is kept up in the labyrinth by the pulsations associated with each beat of the heart. With each pulsation there must be a rise and fall of intralabyrinthine pressure. There are several openings leading from the labyrinth; the aqueductus cochleæ, the aqueductus vestibuli, the oval and the round windows. With each increase and decrease of intralabyrinthine pressure there must result a slight to-and-fro motion of the endolymph, which would be sufficient to keep up a constant stimulation of the hair cells on both sides of each crista.

The clinical phenomena which result from a unilateral disturbance of labyrinth tonus are: First, an increase in tonus from the affected labyrinth, producing nystagmus toward the same side. Second, a complete suppression of tonus in the affected labyrinth, resulting in a nystagmus toward the opposite side. Third, an intracranial irritation, producing nystagmus again toward the affected side.

In order to understand these phenomena resulting from disturbance of labyrinth tonus, it is necessary that one keep distinctly in mind a few fundamental facts regarding the physiology of these canals: First, the impulses from each canal stimulate only those muscles the movements of which lie in the plane of this canal. Second, a motion of endolymph in one direction in a canal stimulates only those hair cells on the side of the crista receiving the impact. In order to stimulate the hair cells on the opposite side of the crista, an endolymph current in the opposite direction is necessary. Third, an endolymph current in one direction in the canal stimulates the muscles which produce movement toward one side; an endolymph current in the opposite direction stimulates the muscles which produce motion in the opposite direction. Take, for example, the muscles controlling the movement of the eyes: an endolymph current in the horizontal canal, from the canal toward the vestibule, stimulates the muscles which produce nystagmus toward the same side, and an endolymph current from the vestibule toward the canal stimulates the muscles which produce nystagmus in the opposite direction. Fourth, it has been demonstrated by Ewald that a greater stimulation results from an endolymph current in one direction in a semicircular canal than in the opposite. For example, in the horizontal canal a greater stimulation results from a movement of the endolymph in the canal toward the vestibule, while in the superior and posterior canals the greater reaction results from an endolymph current from the vestibule toward the canals. Fifth, in all three of the semicircular canals the greater response is obtained from those endolymph currents which stimulate the muscles producing nystagmus toward the same side.

From each semicircular canal, therefore, emanate impulses producing nystagmus in either direction; the stronger impulses always being those which produce nystagmus toward the same side. With these facts in mind one can readily understand why the first symptoms that arise from an extension of an inflammatory process into the labyrinth produce nystagmus toward the same side. The first pathologic change is a congestion. This congestion increases the intralabyrinth pulsation on that side. This increases the tonus from the hair cells on each side of the several cristæ. The stronger impulses emanating from the hair cells which produce nystagmus toward the same side overbalance the normal tonus impulses from the healthy opposite ear. In the same way one can explain why a complete suppression of tonus impulses from one labyrinth produces nystagmus in the opposite direction, because the tonus from a normal labyrinth stimulates more forcibly those muscles producing nystagmus toward the same side. Supposing now that a labyrinth has been completely destroyed and an extension of inflammation takes place, irritating intracranially the vestibular nerve: the result would be exactly the same as a stimulation of the end organs in the labyrinth; that is, an increase in the tonus producing a nystagmus toward the same side.

With this conception of the physiology of the semicircular canals we have a very simple and plausible explanation for the clinical phenomena observed in applying the rotation test in cases where one labyrinth has been destroyed. In these cases we observe that the duration of the after-nystagmus toward the normal ear is much longer than the after-nystagmus toward the affected side; the reason for this being that when the patient is rotated toward the affected side, on stopping rotation the inertia of the endolymph in the horizontal canal of the normal ear stimulates the hair cells on the canal side of the crista. This, as we have seen, is the more sensitive side of this crista, and is the side which when stimulated produces nystagmus toward the same side. On the other hand, if the patient is rotated toward the normal side, on stopping rotation the inertia of the endolymph produces an impaction on the vestibular side of the crista in the horizontal canal of the normal ear; in other words, a stimulation of the group of hair cells which, when stimulated, produces nystagmus toward the opposite side. This side of the crista being much less sensitive than the canal side, the after-nystagmus toward the affected side is much shorter.

With Bárány's hypothesis of tonus centers, the following explanation for these phenomena in the rotation experiment has been offered: The impulses from the semicircular canals on one side influence only the tonus center which produces nystagmus toward the same side. According to this hypothesis it is assumed that an endolymph current in one direction in the canal stimulates this tonus center, while an endolymph current in the opposite direction in this same canal depresses this center. In the horizontal canal, for example, an endolymph current from the canal towards the vestibule stimulates the tonus center which produces nystagmus toward the same side, whereas, an endolymph current from the vestibule toward the canal depresses this tonus center.

In a unilateral destruction of the labyrinth, in order to get any after-nystagmus toward the affected side when applying the rotation experiment, it is necessary to assume that the tonus of this hypothetic center must continue to act indefinitely after its labyrinth has been destroyed. This does not appear to be probable. When the end organs in a labyrinth have been destroyed, one would expect that the tonus of the center for this labyrinth would also die out.

Let us suppose that the right labyrinth has been destroyed. If the patient is now rotated toward the left, on stopping rotation there will be an impact of endolymph in the left labyrinth, on the vestibular side of the crista in the horizontal canal. The impulses from this side of the crista pass to the tonus center which produces nystagmus toward the left. These impulses being inhibitory, depress the tonus of this center. But on stopping rotation in this experiment we get an after-nystagmus toward the affected side. This can only be explained by the continued action of the tonus center on the opposite side, i. e., on the side where the labyrinth has been destroyed.

XIV.

SYPHILIS OF THE EAR.*

By Otto J. Stein, M. D.,

Chicago.

Syphilis of the ear is an old knowledge, recognized in the early history of this disease, but the epoch-making discoveries of Schaudinn, in 1905, of the spirocheta pallida as the etiologic agent of this disease; the cultivation of the spirocheta pallida by Noguchi; the complement fixation reaction of the blood after Wassermann; Noguchi's luetin cutaneous test; the determination of an increase of globulin after Nonne; also the lymphocytosis and Wassermann of the spinal fluid; Noguchi's recent observations on the presence of the spirocheta pallida in certain cerebral diseases, like general paresis, and, finally, the Ehrlich-Hata discovery of arsenic as a therapeutic remedy, have added new substance to the study and are all of the greatest aid to the clinical diagnosis as well as being means of control in the treatment of syphilis.

It is not supposed that we will be satisfied with even our present advanced understanding of this disorder, but with characteristic persistence our profession will prosecute the study of the many still hazy features of this disease. My presentation of this subject will necessarily be limited to certain features, and only in a manner of résumé will touch upon the various characters, leaving to the discussion an elaboration of the undeveloped features.

It is elementary knowledge that all the tissues of the ear may be affected by this disease—skin, periosteum, bone, cartilage, mucous membrane, nerves and vessels—and that the various stages of the disease may even attack the different parts of the ear. The disease may be present in the acquired or inherited form. As a matter of convenience, I will apportion my discussion of the subject to the external ear, middle ear, inner ear and intracranial region.

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EXTERNAL EAR.

As a matter of fact, our observations of syphilitic lesions about the external ear vary considerably, owing, perhaps, in some cases to the class of material available, and again to a neglect in recognizing the probabilities of this disease in all of its protean types in this particular region. At my clinic at the Chicago Post-Graduate Hospital I have learned from the great number of cases seen there to recognize many that otherwise might have passed as of no particular importance or attributed to some other condition.

The chancre or ulcus durum is hard and infiltrated, usually single and umbilicated; the spirocheta pallida may be found on the slide, and the neighboring lymph glands are enlarged and sensitive. It is acquired from a bite, kiss, finger, toothpick, pen, pencil, towel, instrument, etc. It may occur upon any part of the external ear, but most commonly about the external meatus.

Lues of the drum occurs as a papule or minute gumma. These readily disappear under proper treatment, but otherwise usually soften and perforate into the middle ear cavity, creating a suppurative condition there. (Kirchner, Politzer, Gruber, Triquet.)

The secondaries are, as a rule, in the form of condylomas situated at the posterior auricular attachment, especially in young people; but occasionally, when found about the entrance of the meatus, they resemble granulations or polypi. The maculopapular eruption has been observed in the canal as well as on the drum.

The tertiaries form an interesting class of external ear lues. According to Gruber, Kirchner and Moss and Steinbrügge, there is a type that is due to a periostitis of the bony canal—not to be confused with a gumma—which by the pressure exerted causes considerable pain, even on movement of the lower jaw, as in eating. Some of the exostoses one sees causing narrowing or occlusion of the canal are the result of a former active luetic periostitis.

Occasionally gumma of the mastoid are seen. Bruehl[1] recently reported such a case. These gumma may disappear under treatment, or they may disintegrate and create considerable destruction. When they soften in the canal they appear as an ulcer covered by a yellow grayish secretion.

MIDDLE EAR.

If one investigated thoroughly into the etiology of all middle ear cases presenting at a large clinic, the frequency with which lues appears would create no little astonishment. It is true, the association does not necessarily determine the cause in all such middle ear cases, but the frequency of association, the symptomatology as brought out from the past history, the old landmarks still present of former active processes, all tend to strengthen one's convictions of the commonness of lues as a cause of middle ear disease.

There is no description that will characterize a middle ear lues clinically. We are today, in this respect, not much changed from the position taken by Lowenberg forty-five years ago, when he said they, at that time, knew practically nothing about it. We, as they, still have to build up our evidence from a careful scrutiny of the parts in search of tiny gummas, periosteal thickening and ulcerations, and also from the history, neighboring lesions, laboratory tests, the presence of sequestrums with tell-tale odor, and finally by the response to treatment. But from the new knowledge learned from Schaudinn, Wassermann and Noguchi, a more accurate understanding of diagnosis in middle ear cases will surely result.

An endarteritis of the mucous membrane, and a periostitis of the bony walls, aside from gumma, constitute perhaps most of the pathology in this region. When the periosteal thickening following the periostitis involves the inner or labyrinth wall, ankylosis of the stapes may result. Habermann called this luetic sclerosis. A few years ago (1903) I published a paper on osteosclerosis of the mastoid,[2] which report is in accord with what Moss and Steinbrügge speak of as sclerosing mastoiditis the result of luetic periostitis. These were cases that presented an obscure otalgia, that proved later to be due to luetic periostitis, both of the middle ear walls and mastoid cells, and this without other evidences of ear trouble.

Lues of the tube in the primary form usually occurs at the faucial end, the result of dirty instrumentation, like a catheter. As secondaries it appears as an erythema or as pearl-like plaques (Deprès) at the faucial mouth. Tertiaries may also occur.

Perhaps some of the strictures of the tube that we frequently meet with are the result of healed ulcerations of luetic origin.

INNER EAR.

Inner ear affections are labyrinthine or retrolabyrinthine. In the acquired form of inner ear lues the disease usually appears at the end of the secondaries, although it has been noted as early as one week after recognition of the chancre, and again in some cases delayed for years.

The ear symptoms are like those of any other nerve deafness, with or without the vestibular symptoms.

The deafness is rapid in its progress and soon becomes quite profound. There is no preponderance of lost hearing in either the upper or lower end, but the entire scale, as a rule, is affected, with occasional islands of hearing for a little while. It has been my experience to find that only one ear may be involved, although it is but a matter of a short time before the other likewise exhibits similar changes.

The inherited form of inner ear lues may appear at any time of life, from infancy to middle age and past, but the far greater number are observed first between the eighth and sixteenth years. The combination of interstitial keratitis, pegged incisors and deafness at this age is familiarly known as the hereditary triad of lues. But this arrangement of symptoms is not invariable. I have quite often seen the teeth normal, while again I have seen the cases when their hearing was normal. Sometimes the deafness is from middle ear changes, with no labyrinth involvement. But the majority of my cases when first seen had marked nerve deafness, even unto deaf-mutism.

The deafness comes on quite suddenly; in fact, often over night or after some prolonged exposure or exertion. Occasionally it may appear rather suddenly and progress with only fair rapidity. It is usually bilateral and, according to Fraser,[3] frequently associated with ozena.

Where Ménière's symptom complex occurs, it has, according to Grey, this striking peculiarity: that when due to lues there is but one such attack, while if due to other causes there is the likelihood of similar attacks.

The pathology, as presented to us by Politzer, Moss and Steinbrügge, consists of a round cell infiltration and hyperplasia of connective tissue substance, especially of the periosteum. There may be a serous labyrinthitis following a severe hyperemia, and even pus; new bone formation; chronic endarteritis, and hemorrhage into the fibers of the cochlear nerve, leading to atrophy, particularly in the basal coil and of the cells of the spinal ganglion. Gumma may be found in the petrous bone. Periosteal thickening causing pressure in the internal auditory canal may result in paralysis of both the seventh and eighth nerves. According to Rosenstein, a chronic basal meningitis about the entrance of the auditory meatus is much the commonest cause of these symptoms.

It is my belief, based upon the experience I have had with the use of salvarsan, that lues of the ear responds favorably to the action of this remedy, in both the acquired and inherited form, provided treatment is commenced within the first few weeks, better if in the first week, of its manifestation, and also if pushed energetically and supplemented by the use of mercury and K. I. The socalled neurorecedives, that have attracted so much attention lately, have but very seldom occurred in my cases, and in no case was there lasting involvement of the nerves. I am of the opinion of Haike and Wechselmann that the superior activity of salvarsan over mercury in penetrating the nerve structure and exciting the hibernating spirochetes to "move on" may account for these nerve symptoms, which would most likely occur later on if left to other forms of treatment, because all other forms of treatment seem not to reach these nerve stations. Perhaps in some cases where the nerve manifestation appears within a few days following the salvarsan, obliterating the canals and ankylosing the stapes, the condition is simply a Herxheimer phenomenon, but I cannot attribute it to any selected toxic action of the drug.

INTRACRANIAL AFFECTION.

The intracranial affection may be located most anywhere within the skull, but, according to the symptoms produced, it is convenient to speak of a lesion of the cortex, of the midbrain or nuclei, of the cerebellar pontine angle, and of the cerebellum. In the latter case disturbed equilibrium is present, similar to that of vestibular origin.

The pathology of lues in this territory is meningitis, endarteritis and gumma, named in their order of frequency.

As the fibers of the cochlear nerves cross at various places along the route from their nuclear origin near the fourth ventricle to the cortex of the temporal lobe, a lesion located in the auditory area of one temporal lobe seldom creates actual disturbance of hearing in either ear (excepting sensory aphasia, that may be present and mistaken for real deafness). Bilateral lesions have been known to cause complete deafness.[4] Deafness in both ears may also result from a lesion that encroaches upon the cochlear nerves where the fibers of each are situated close together, as in the ponsmedullary region. This is known as a midbrain or nuclear deafness, and is not to be confused with the cortical deafness just referred to. In the midbrain variety of the disease various symptoms, as a rule, are present that designate the seat of the lesion, such as ophthalmoplegia, dysarthria, ataxia, apoplectic attacks, bulbar paralysis, headaches. In fact, all kinds of neighborhood symptoms may be present, depending upon the extent and rapidity of the process, and particularly if acute in character. Large lesions and chronic cases are less likely to exhibit symptoms.

A lesion of the cerebellopontine angle gives rise to a one-sided deafness which appears early and usually has associated with it a facial palsy, vertigo, nystagmus, glossopharyngeal paralysis, etc.

In the diagnosis one may consider a rapid onset, profound deafness, or, at least, of severe degree, slight or absence of tinnitus (Siebenmann), associated protean manifestations of cerebrocerebellar characters, normal drum and open tubes, as strongly presumptive of intracranial lues. As additional evidence we have a facial palsy that may improve under treatment; also such other direct evidence of the disease as pegged teeth and scarred eyes, the blood and spinal fluid reaction to the Wassermann test, and the skin reaction to Noguchi's test.

In the differentiation one must particularly keep in mind the possibility of leukemia, pernicious anemia, diabetes, rheumatism, digestive disturbances, arteriosclerosis, aneurism of the basilar artery, neoplasm, traumatism, toxic neuritis, occupational causes, hysteria and malingering.

The following case of intracranial lues presents several interesting features, chief of which were profound deafness with diabetic symptoms:

Male, forty-one years, otherwise healthy, digestion good; eyes, urine, temperature and blood pressure normal. Excessive user of tobacco. Gradual impairment of hearing, with mild tinnitus in left ear for two years. Sudden and profound loss of hearing in both ears on return from a long and tedious drive in the country. No vertigo, nausea, vomiting or tinnitus. On examination, he heard no voice at all, nor any tuning fork, either by air or bone. No spontaneous nystagmus, but both ears reacted normally both to the caloric and turning tests. Drums normal; tubes open. Wassermann strongly positive. Increasing doses of iodid of potassium and mercury up to 160 grains, and one-fifth of a grain respectively were taken daily for two weeks. Then six-tenths gram salvarsan intramuscularly. The latter was repeated four weeks later, with a continuation of the iodids and mercury. Between seven and nine weeks from commencement of the treatment symptoms of diabetes with other fourth ventricle disturbances began to appear, terminating in coma and death.

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XV.

ESOPHAGOSCOPY.*

By Stanton A. Friedberg, M. D.,

Chicago.

The history of the development of endoscopy, both bronchial and esophageal, is of such comparatively recent date that laryngologists, even of tender years, cannot fail to be familiar with it. In no other branch of our specialty is the interest so keen as in this field. In no other branch is there greater possibility for investigation of diseased conditions. In spite of the labors of many in the past few years, we are still working in a practically unexplored field, and years must elapse before a proper interpretation may be placed upon some of the results that are being obtained and some of the conditions that are being determined. At present the question of the presence and removal of foreign bodies occupies the greater interest. Why this should be so may be readily perceived. The visible evidence of an accomplished effort is a source of satisfaction to anyone, and the psychic influence upon a patient or other interested parties at the sight of the cause of trouble is usually sufficient to evoke unstinted declarations of appreciation.

But there is another important phase of this work not to be overlooked. Ramming a rigid tube through the larynx or esophagus does not constitute endoscopy. The first thing one must learn, if he is to do this work with reasonable success, is that the utmost gentleness of manipulation must be employed. The use of force in attempting to pass a tube is never justifiable and is a technical error. Ill advised efforts may result in as great or greater harm to the patient than the foreign body would cause if left undisturbed. Those who have seen the result of blind and forcible attempts at removal can testify to this fact. While the disappointment is great in a failure, it may be largely mitigated by the knowledge that one has not left his patient in a worse condition than before the operation.

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The indications for esophagoscopy may be broadly included under the heads of diagnosis and treatment. Under the latter we would place the removal of foreign bodies. In order to limit this paper I will confine myself chiefly to a discussion of the various conditions and phases that have presented themselves in my rather limited experience, more particularly in foreign body work.

Nearly all of the cases requiring operation for foreign bodies that have come under my observation have had the offending substance in practically the same location, commonly in the cervical portion of the esophagus, or, in other words, between the lower border of the cricoid cartilage and the level of the suprasternal notch. Why this should be so is not absolutely clear in my mind, but there is hardly any doubt that the explanation must be sought on physiologic and anatomic grounds. The cervical portion is the narrowest part of the esophagus, but I believe it allows of as much distensibility as the mouth. We are all aware of the sensation that a morsel of food, either too dry or too large, will produce in this region. A possible explanation for this may be seen if one studies the attachment of the inferior constrictor muscle to the cricoid cartilage.

Several years ago Dr. Wilson showed, before the Chicago Laryngological Society, a specimen in which there was a small triangular area beneath the inferior constrictor in which the muscle fibers were entirely absent. This would have the effect of weakening this part of the esophagus, and in the case of too large or unusual substances the power transmitted by the voluntary act of deglutition to the inferior constrictor would not, by reason of this weakness, be sufficient to force the substance downward. Not having received sufficient impetus in its downward course, the esophageal peristalsis, which constitutes the second or involuntary stage of swallowing, would not be strong enough to carry the offending material farther. As other contributing factors, may be mentioned the size and nature of the foreign body. The size may be so large as to render it mechanically impossible for any downward extension by reason of a change in the axis of the body. Sharp pointed substances may penetrate the mucosa or muscular coat and thus be held in a fixed position. The administration of emetics may serve to bring about this condition. Substances with roughened edges may set up an irritation that rapidly leads to an edematous swelling of the surrounding tissues. The pain itself caused by a foreign body may cause the patient instinctively to keep from swallowing, thus favoring fixation by swelling, inflammatory or edematous.

The question of the removal of these foreign bodies situated in the upper part is not as simple at times as one would be led to suppose. Their apparent accessibility, as far as distance is concerned, may not possess any advantage unless one is familiar with just what may occur in this situation. All who are doing this work, at some time or other, have had the experience of the ease with which a foreign body may be overlooked when lying in the upper part of the esophagus. This may be due to several causes. Chief of these are an improper position of the head and the introduction of the tube without making use of the light until the tube is well engaged in the esophagus. If the latter course is pursued the foreign body may be loosened from its fixed position and enough force given it by the end of the tube as to enable the esophageal peristalsis to carry it into the stomach. However, the chief reason for failure seems to me to be the following:

In introducing the tube the end naturally impinges on the posterior pharyngeal wall. In passing the cricoid cartilage this position is maintained and the rigidity of the cricoid tends to keep the end of the tube pressed against the posterior wall. It is in this position that the tube may pass behind the foreign body, crowding it forward to the softer tracheoesophageal wall, and thus, even if the tube is introduced under the guidance of the eye, it may escape the view of the operator. In this situation the ledge or the under part of the cricoid cartilage may aid in hiding the body. When much of an inflammatory swelling or edema is present, surrounding the foreign body, it may escape observation, even when the tube is brought upward and careful search is made. As this may occur with comparatively large bodies, as, for example, coins, it is needless to speak of the difficulties that smaller substances or particles may present.

The diagnosis of the presence or absence of foreign bodies is not at all times a simple matter. The history as given by the patient, or, in the case of a child, by its parents, although of the greatest importance, may frequently be misleading as to the location in the esophagus or respiratory tract. Invariably the statement is made that the patient swallowed whatever the substance may be. No differentiation is made between inhalation or aspiration and the act of swallowing. Cough, dyspnea, cyanosis, pain, usually early, are the chief diagnostic points, if the foreign body is in the respiratory tract. To these, of course, must be added the physical findings, such as dullness, diminished respiratory murmur, rales, etc., if it is situated in a bronchus. Pain and difficult deglution are most important evidences if the esophagus is involved. The pain may be referred to the side of the neck or even to the posterior cervical region. Interference with deglutition in the case of children as a rule only extends as far as solids or some of the semisolid substances are concerned. We are usually able to get a history that the child can swallow milk or other fluids. In some instances where the foreign body has remained in the esophagus for a little time, and there is swelling present, the secretion from the mouth and pharynx will gather in the pyriform fossa and in the postarytenoid space, and by running over into the larynx will cause cough. At times characteristic in children is the form of the cheeks and lips of the child. These are distended to a moderate degree and is always an evidence of the accumulation of saliva in the mouth, owing to the child's unwillingness to swallow, due to the difficulty or pain. The pressure of an unusually large foreign body against the anterior wall of the esophagus will also produce dyspnea and may be the cause of confusion in determining the exact location of the foreign body.

Increased pulse rate and temperature may be present if a foreign body is present in either the esophagus or respiratory tract, and depends upon the length of stay of the foreign body and the changes in the tissues produced by it.

The skiagraph is of the greatest importance in the location of the foreign body, especially if the latter be of metal or glass. Certain substances, such as a vegetable ivory button, will not give a shadow. In other substances with slight density the shadow of the vertebra is very apt to hide the slighter one. An important fact to be remembered is that a picture, in order to be of the greatest value, should be taken within a reasonably short time previous to operation, for, as has happened, one may have the experience of searching for a foreign body that has already passed into the stomach. In spite of negative X-ray findings, when any reasonable doubt exists as to the presence of a foreign body, an examination is justifiable. At times, as will be shown later, it will be necessary to have a number of pictures taken. Stereoscopic skiagraphs are of greater value than the single picture, as the latter may at times mislead one as to the location of the foreign bodies. I have seen plates of the same case made by different radiologists, in one of which the foreign body was shown apparently as low as the bifurcation, owing to the angle at which the picture was taken, but at the operation it was found to occupy a higher position.

The question of anesthesia is an imporant one. If any anesthetic is to be given, my personal opinion is that ether is to be preferred, in spite of its disadvantages. Among the leaders in this work the tendency of the day is to avoid the use of any anesthetic, either general or local. While I have removed foreign bodies in a few cases without the use of an anesthetic, my preference and custom is to have administered just enough ether to cause the preliminary relaxation and immediately proceed with the operation. The patient is allowed to recover consciousness while the operation is in progress, care being taken to prevent the child from struggling. As one acquires experience, with a corresponding improvement in technic, anesthesia may become less and less necessary. This perhaps applies more forcibly to bronchoscopy, as one must hesitate to add the dangers of anesthetic complications to the serious conditions already present.

In regard to instrumentation, it depends largely in which school one is trained. Whether one uses the proximal or distal light is a matter of the personal equation. The source from which the light is maintained is of greater importance, as the use of the street current may prove unpleasant to the operator and dangerous to the patient. One of the most valuable instruments in the armamentarium is the direct or open tubular speculum. The proper use of this instrument in many instances will obviate the necessity of the use of the endoscope in the removal of foreign bodies from the upper part of the esophagus.

In two former articles the writer presented the history of a number of cases pertaining to foreign bodies in the esophagus.[1] A brief summary of these cases is as follows:

Case 1.—A boy, ten months old, with some difficulty in swallowing, irregular temperature, up to 101° F. The skiagraph apparently was negative, but owing to the nature of the foreign body a wrong interpretation was made. Examination revealed a broken toy ring hooked over the left arytenoid cartilage, projecting downward toward the mouth of the esophagus. This was easily removed.

Remarks.—This case illustrates the value of examination in cases where a reasonable doubt exists as to the presence or absence of a foreign body.

Case 2.—A boy, two years of age, with a coin in the esophagus for three days. A number of attempts had been made at removal without result. On admission to the hospital the child was septic, with a rather high temperature, and was quite ill. I failed in two attempts of short duration to find the coin on account of the swelling surrounding it. The coin was finally removed by Dr. Ingals. The child gradually failed and died in about three days.

Remarks.—This is the only fatality that I have to record from a foreign body in the esophagus in my own series of cases. I have always felt that the possibilities of success would have been greater had there not been so much traumatism resulting from the previous blind efforts at removal.

Case 3.—A girl, five years old, had swallowed a marble five days previous to entering the hospital. On account of the difficulty in securing a proper hold with the forceps considerable trouble was experienced. It was finally grasped with sufficient firmness so that its removal could be brought about. The marble was about 11 mm. in diameter.

Remarks.—It is hard to understand why such a comparatively small smooth body could have remained in the esophagus such a length of time. When finally secured it was at the lower part of the esophagus, just above the diaphragmatic constriction.

Case 4.—A girl, one year of age, with a penny in the esophagus. In this case I failed to find the coin with the esophagoscope, but on using the open tube speculum no difficulty was found in removing it.

Case 5.—A child, seventeen months old, with a penny in the esophagus for four days. Increasing difficulty in swallowing. Removal without anesthesia with the open tube speculum and forceps.

Case 6.—A girl, five years old, with a tin whistle in the upper part of the esophagus for four days. Patient had considerable difficulty in swallowing and refused to make the effort. On the fourth day, however, she took a cup full of water and ate some plums. Pain was referred chiefly to the lower part of the posterior cervical region and the sides of the larynx.

Operation.—Examination was made without anesthesia and the whistle found. It offered so much resistance to removal that I judged it best to administer ether. The whistle was then removed and was found to be 2.2 cm. in diameter. It was located about the level of the suprasternal notch.

Remarks.—The fact that on the fourth day, when one could logically expect an increase in the difficulty in swallowing, the child was able to drink water and eat plums, illustrates how misleading the symptomatology may be at times. In this case we had a positive skiagraph, so that there was no doubt. In the absence of a picture, one would perhaps be tempted to delay on account of the abatement of symptoms.

Case 7.—A man, thirty years of age, while eating soup the night before, felt a choking sensation as if a bone had lodged in the throat. Examination was tried under local anesthesia, but on account of the great pain, it was extremely unsatisfactory. There was great swelling and edema of the lower part of the right side of the pharynx, epiglottis and aryepiglottic fold. This also extended into the mouth of the esophagus. The pain was referred along the side of the neck, and the patient was unable to take either fluids or solids. Under ether the next day, esophagoscopy was performed without revealing the bone. Subsequently under treatment the swelling in the lower part of the pharynx subsided, and the foreign body was found imbedded in the right pyriform fossa and removed. Its measurements were 2.5 cm. by 1.5 cm. The skiagraph was indefinite and unsatisfactory.

Remarks.—An attempt at removal covering two and one-half hours' duration had been made previous to admission to the hospital. This in a measure was no doubt responsible for the extensive edema present and which served to make the examination difficult. A more careful search would perhaps have led to the discovery of the bone and rendered esophagoscopy unnecessary. The case, however, was not without value, as it demonstrated the necessity for a careful search of the pyriform fossæ in suspected cases of foreign bodies in the upper part of the esophagus. The seat of pain may at times prove deceptive, if one depends entirely upon it, in the localization of the foreign body.

Case 8.—A child, fourteen months old, had swallowed a small metal toy. Under ether I succeeded in finding the foreign body, but the resistance to removal was so great that I removed the tube and inserted a larger one with the hope that I might succeed in dislodging it with the end of the tube. I succeeded beyond my most sanguine expectations, so much so that I was unable to find the foreign body again. The father would not leave the child in the hospital, and even in the beginning would not allow us sufficient time for a radiograph or preparation of the patient. This case was a source of regret to me for several years, until I finally learned that the toy was passed by rectum a day or so later, and that the child made a good recovery.

Remarks.—A lesson learned in this case was that when one is consulted and assumes the responsibility in these cases, he should insist on the perfect cooperation of the parents. Neither is it wise to undertake any examination unless preparations have been made for any possible contingency that may arise.

For their statistical value, the following additional cases are reported:

Case 9.—Female, age seventeen years, while eating veal the day before, felt as if a piece of bone had lodged in her throat. She is able to take fluids but no solids. She complains of rather severe pain which is referred mostly to the sides of the larynx.

Operation.—Ether anesthesia. Open tube speculum. A sharp rough round piece of bone, 2 cm. in diameter, was found below the cricoid cartilage and removed. Patient was discharged the next day in good condition.

Case 10.—Child, nineteen months of age, swallowed a button six days previously. Since then she has been unable to swallow anything but fluids. The skiagraph was negative.

Operation.—Small amount of ether. Open tube speculum. The button was located in the upper part of the esophagus and removed without difficulty. It was of vegetable ivory, which probably accounted for the negative skiagraph. The parents were allowed to take the child home the same afternoon.

Case 11.—A girl baby, age thirteen months, six days before, had swallowed a penny which seemed to lodge in her throat. Following this she had a choking spell, accompanied by gagging and retching. Only fluids could be swallowed. As evidence of the pain and discomfort present, the baby held her hands over her chest and mouth most of the time. Temperature was 100.8° F.

Operation.—Just enough ether was administered to obtain relaxation. The open tube speculum was introduced, but some difficulty was found in locating the penny on account of an improper position of the head. As soon as this was corrected, the edge of the penny was easily seen and was removed immediately with no further difficulty. Temperature was normal on the following morning and the child was taken home.

Case 12.—A boy, age eighteen months, the morning of the day before admission to the hospital was given a part of the movement of a watch or small clock to play with. He placed it in his mouth, together with a cracker he was eating, and attempted to swallow the mass. This was followed by a choking spell. He was given some milk to drink, and a member of the family thrust a finger into the baby's throat, either to produce vomiting or to remove the wheel, without bringing about either result. The child became very listless and wanted to rest. A fluoroscopic examination showed the foreign body in the upper part of the esophagus. Temperature before operation was 100° F.

Operation.—Minimum amount of ether. By means of the open speculum the foreign body was located below the cricoid cartilage in the upper part of the esophagus. The wheel was seen to be notched and was on an axle projecting from either side. On account of the projection of these ends of the axle considerable care was necessary in bringing about its removal so as to avoid lacerating the esophagus. On removal, the diameter of the wheel was found to be five-eighths of an inch and the length of the axle three-eighths of an inch. Recovery was uneventful, the child being permitted to go home the following day.

Case 13.—Girl, eight and one-half months old, had swallowed an open safety pin fours day before. The accident was followed by a coughing spell. Since then the child had shown very little discomfort. The temperature was normal. The skiagraph showed an open safety pin above the sternal notch with the point projecting upward.

Operation.—Ether anesthesia. After several attempts to close the pin with various pin closers, it was finally grasped and closed with an Arrowsmith forceps and withdrawn. The open tube speculum was used. No traumatism to the esophagus. Recovery uneventful.

Case 14.—Boy, age three years, was playing with some nickels and pennies when he suddenly had a choking spell. His mother looked into his mouth and seeing the coins was able to remove one. The others she pushed down into his throat. The accident happened three days before admission to the hospital. Other than some difficulty in swallowing the child has felt well. The skiagraph showed what appeared to be a single coin above the suprasternal notch.

Operation.—Ether. Open tube speculum. A nickel and two pennies were removed. It was found that they were stuck together, which accounted for the fact that they were all removed at the same time.

Case 15.—Girl, two years old, had swallowed an ordinary telephone slug seven days before. Since then she has had considerable difficulty in swallowing and some trouble in breathing. The skiagraph showed the slug in the usual location.

Operation.—Ether. The slug was quickly found and removed without difficulty. Uneventful recovery.

Case 16.—Child, age two years, was sent into the hospital from the dispensary. The history given was that a nickel had been swallowed a number of days before. Although there was some difficulty in swallowing, the child did not seem to be suffering.

Operation.—Ether. Open tube speculum. The nickel was found in the upper part of the esophagus and removed.

Case 17.—A boy, twenty months old, had a quarter in his esophagus for several days. Some difficulty in swallowing was present. The skiagraph showed the coin at the level of the suprasternal notch. The temperature was 100 3/5° F. on admission.

Operation.—Ether. Open tube speculum. No trouble was encountered in finding and removing the quarter.

Case 18.—A girl, three years old, had swallowed a brass button two days before admission to the hospital. Following the accident the child vomited her breakfast. She was peevish and cried a great deal. Liquids could be taken. The cheeks and lips were distended on account of the excess of saliva accumulating in the mouth on account of the child's unwillingness to swallow. The temperature was 99 3/5° F. The skiagraph showed the button in the upper part of the esophagus.

Operation.—Ether. Open tube speculum. The button was found and removed without any special difficulty. It measured 2.2 cm. in diameter.

Case 19.—A girl, sixteen months old, two days previously had swallowed a button. It was stated that since that time she had only been able to take fluids.

Operation.—No anesthetic was administered. Examination of the upper part of the esophagus was made with the open speculum and revealed a dirty grayish mass, which was removed. It consisted of small pieces of meat. After this was removed the button was seen, but on attempting to grasp it with forceps, it became dislodged and slipped down the esophagus. I passed the esophagoscope without finding it again. Feeling sure that it had passed into the stomach, the parents were allowed to take the child home with instructions to watch the stools. The button was passed forty-eight hours afterwards.

Case 20.—This was another unsatisfactory case from the standpoint of the collector of specimens of foreign bodies, but was gratifying to the patient. A man, thirty-five years of age, complained of intense pain in the lower part of the esophagus which he thought came from a piece of bone that he had swallowed. Every attempt to swallow was accompanied by such an acute pain that the patient refrained as much as possible from making the effort. He had temperature around 100° F.

and was unable to rest at night. Esophagoscopy under local anesthesia revealed a small piece of bone which had become lodged at the diaphragmatic constriction. There was considerable congestion about the opening. The bone was seized, but on bringing it up it slipped away from the forceps and passed on down the esophagus into the stomach. After its dislodgement the relief from pain was almost immediate and the patient was able to swallow without difficulty.

Remarks.—The disappointment to the operator is usually great if one finds the foreign body and then fails to secure it. The end result as far as the patient was concerned was the same in the case I have cited as if the foreign body had been removed through the tube. Consequently, these cases cannot be said to be failures.

The statement was made above that it is well to have a skiagraph made within a reasonably short time previous to the examination. The following case will illustrate this point.

Case 21.—A boy, two and one-half years of age, had swallowed a tin whistle. He was brought to the hospital on the following day. At this time he complained of pain which he located in the region of the thyroid cartilage. The skiagraph showed the whistle in the upper part of the esophagus. I saw the child the next day, about twenty-four hours after the skiagraph was taken. Under ether the examination was made with the open tube speculum, but the whistle was not found. The esophagoscope was then passed with a similar result. Inasmuch as the speculum had never failed to show a foreign body of this size in this location, I believe my conclusion that it had already passed into the stomach before examination was justified. A picture taken shortly afterward showed the whistle in the stomach.

Another statement made was that at times it will be necessary to have a number of pictures made. An exemplification of this is seen in the next case.

Case 22.—A girl, thirteen years of age, stated that while holding seven or eight pins in her mouth she became frightened and swallowed them. This had occurred two days before. She complained of pain in the right lower side of the abdomen and of painful and difficult deglutition. The skiagraph showed a number of pins in the lower part of the pharynx and one apparently about the mouth of the esophagus. There was also the shadow of a pin in the right iliac fossa.

Examination.—One pin was found between the base of the epiglottis and the root of the tongue. Esophagoscopy under ether failed to reveal any more. A picture taken that evening still showed pins present. Examination of the pharynx and another esophagoscopy were without result. Another picture was taken which was negative. However, the patient still complained of pain in swallowing, and after a thorough examination two pins were found below the lower pole of the left tonsil. In view of the preceding negative skiagraph we began to suspect that we had to deal with a case in which the pins had entered on different occasions. A general examination showed the absence of the conjunctival reflex and an insensitive pharynx. The larynx was normal. The mother was interrogated and stated that the girl had the habit of placing extraneous substances, such as buttons, in her mouth. The patient strenuously denied placing the pins in her mouth intentionally. Confirmation of our suspicions was brought about by the next picture and examination. This showed a pin in exactly the same location between the base of the epiglottis and tongue as the first one removed. In this situation it would have been impossible to have been overlooked in any kind of an examination. After this pin was removed the patient by her attitude practically admitted that our suspicions were true. The pain disappeared from her throat and after being kept under observation for several days she was allowed to return home.

To enter into a discussion of esophagitis produced by the passage of a foreign body would prolong this paper to too great a length. It is a recognized fact that the symptoms may persist for a considerable time after the offending substance has passed into the stomach. One other result of injury to the esophagus in connection with a foreign body needs to be mentioned, that of periesophageal abscess. I have seen only one case, of which the history is as follows:

Case 23.—A man, about fifty years of age, swallowed a piece of bone which he thinks lodged in his throat. This occurred five days before. He consulted a physician, who stated that he could find no bone and advised a gargle. Later an attempt was made to extract the bone with a horsehair bougie. Since the accident the pain has gradually increased. It is almost impossible for him to swallow fluids. His temperature on admission was 101° F., pulse 120. He had a lesion at both the aortic and mitral valves, and the urine showed both nucleo- and serum albumin.

Examination.—The mouth of the esophagus was seen to be greatly swollen. On attempting to pass the tube some pus was seen. On working the end of the tube over the point from which the pus appeared, between one and two drams of a very foul smelling pus was forced out. There was some relief to the patient, and it was decided that further examination should be postponed, as it was impossible to pass any sized tube through the swollen area. Following this examination, there was considerable discharge of pus and the temperature dropped to 99° F. On the second and third day it rose to 100° F., but on the fourth day it dropped to normal, where it remained. About the seventh day the symptoms had practically subsided and esophagoscopy was performed. A tube was passed without difficulty and showed a small mass of granulation tissue on the right side of the esophagus, about 2 cm. below the cricoid cartilage. No foreign body was found. Recovery of the patient was complete and was a fortunate outcome of what promised to be a serious condition. Whether the infection arose primarily from the irritation caused by the foreign body or from the passage of the bristle bougie, it is impossible to say. The continuous application of cold compresses to the neck and the taking of iced drinks were undoubtedly an aid in preventing an extension of the infection, although naturally the chief factor in securing the cure was the evacuation of the pus.

SUMMARY.

Of the twenty-three cases presented, foreign bodies were removed from the esophagus in sixteen, one of which was but partially successful. In two others, the foreign body was secured, but was lost and passed into the stomach. In three cases the symptoms were those of esophageal involvement, while the cause of trouble was located in the lower part of the pharynx and removed. In the remaining two cases, no foreign body was present, in one of which a periesophageal abscess was found. One fatality is noted. In thirteen of the sixteen cases, the age of the patient was under three years, the youngest being eight and one-half months old

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XVI.

THE EPIPHARYNX IN CHILDREN.*

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We can almost make the statement that the only importance of the epipharynx in children, as well as in adults, is due to its association through the eustachian tube with the ear, for with few exceptions we are called upon to treat this area for some resulting or threatened pathology. As over ninety per cent of all pathologic conditions met with in otology are due directly or indirectly to some existing or preexisting pathology within the epipharynx and eustachian tubes, the study of this area becomes the foundation upon which rests our profession as otologists. Anything we can avoid doing which may be liable to result in conditions favoring otologic disease should be followed with as keen interest and care as the more spectacular and brilliant procedures to combat the later advancing disease in the middle ear, mastoid cells, labyrinth, and cranium. The majority of us will agree concerning this subject; and yet there is not one of us to whom it is not more fascinating to perform the major surgery than it is to carry out the sometimes protracted and tedious work of discovering and removing the frequently seemingly less important etiologic conditions within the epipharynx. The idea which we must strive to attain is to be able to not only diagnose all the pathologic conditions within the epipharynx, but to be able to so combat and eradicate them as to prevent their extension into and their effect upon the aural structures. This ideal opens up a field which will doubtless give us no rest or lack of interesting research for many years to come. I believe that by improved methods and with more definite knowledge we shall be able to preserve more and more ears, and thus prevent a great loss of proficiency, not only to the individual, but to society in general.

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Since 1885, when Emil Mayer presented the result of his studies upon the epipharyngeal hyperplasia of Waldeyer's ring of glandular tissue, volumes have been written concerning this subject. Men of marked ability and special experience, as well as those who have seen comparatively few cases, have written upon the subject of adenoids in children; and yet even today, when we ask ourselves or discuss the subject with others, we find that there is so much concerning etiology, treatment, and prognosis that is in doubt, that we cannot make a positive statement which can be applied in general to this common condition. Our knowledge concerning the acute and chronic inflammations of the epipharynx, whether due to local infection or existing as sequelæ of various pathologic conditions of other organs, is so far from positive that we must still continue to study and strive if possible to establish sufficient facts to enable us to not only make a correct diagnosis of epipharyngeal disease, but in a large percentage of cases to be able to ascertain the etiologic factors producing these pathologic changes, and shall also know when and how to proceed with the treatment, operative or other, for the best future as well as the immediate results in the individual case. Some will think it strange that I should raise the question in regard to epipharyngeal adenoid hypertrophy, for they will say: "If there is adenoid hypertrophy, just remove the growth and that will be the end of the trouble." I wish it were so, for the whole subject would be reduced to a simple one of fact, and our students could be told that whenever there is a swelling of the glandular tissue, whether acute hyperplasia or chronic hypertrophy in the epipharynx, just curette it out and all will be well. We all know that there are many children who are afflicted with middle ear disease who have adenoid hypertrophy, and who are entirely relieved when this adenoid obstruction is removed; and we also know that there are many other cases which are helped for a short time and then become as bad as before. Some of these have recurrence of adenoid hyperplasia, but many do not. Some cases are not helped in the least by an adenoid operation, and may even be worse than before. Quite frequently we find in children, as well as in adults, a marked tendency to epipharyngeal and tubal disturbances, with the resulting aural complications, when we find anatomically an apparently normal nose and epipharynx. Again, there are many cases where some deformity is found in the nose or postnasal space, and when these are corrected there is no apparent improvement. We have only to review the special literature to see how prone we all are to become narrow in our observations and to consider our subject as an isolated field, free from external influences. Although it is at present not possible, with all our aids in investigation, to always feel at all sure of our ground, it is our duty, so far as it is within our power, to consider abnormal conditions within the epipharynx from various viewpoints before deciding upon a course of procedure.

Before taking up my special study of the epipharynx, I questioned why there should be such a difference in the results following apparently the same operation for apparently the same pathologic conditions; but I had not reckoned sufficiently with the various resulting influences of the same amount of excessive tissue, due to the difference in size and shape of the epipharynx and the varying position and patency of the eustachian tube, nor had I given sufficient consideration to the resulting cicatricial tissue which follows the usual operative interference for the removal of the epipharyngeal adenoid mass. The adhesions found in the lateral fossæ, the semiatrophic areas sometimes found in the vault of the epipharynx, with the resulting interference with the pharyngeal end of the eustachian tube in patients operated upon by our most skilled surgeons, trained in our special work, make us stop and question. While we are studying this subject we can easily become pessimistic and be led so far toward the side of nonsurgical interference as not to be conservative. It is not the purpose of this paper to court pessimism, but to present some facts while discussing this subject which will show that we are but beginning to learn the rudiments of the subject which has been so studied, hashed and rehashed for nearly thirty years.

Were it not for cicatrices and their effect upon the eustachian tube, the subject of adenoids would be of little importance, for with our present knowledge the immediate resulting effects of the adenoid operations are very rarely bad, and frequently the individual is improved in many respects. The results are so excellent in many severe cases that the physician of moderate training and ability, as well as the guardian of the child, is frequently led to think of an adenoid operation for all the ills of childhood, from indigestion to enuresis. During the past few years it has been the pastime of the mediocre family physician to advise and try to perform an adenoid operation upon every child who shows any symptoms of ill health. In many cases little is accomplished or little trauma produced, but often the walls of the lateral fossa are injured; and we have seen the mucous membrane and also the cellular tissue removed to such an extent as to bare the bone in the epipharyngeal vault.

The unskilled work in the epipharynx does not concern us so much here, but the work performed by our school physician and nurses, complemented by the hospital outpatient clinic, does. The school children in our cities are referred by the young school physician and conducted in droves by the school nurses to the various clinics, and we, as a rule, are prone to give them a quick glance, and then pass them on to the young interne or assistant surgeon for operation. I believe that in this manner we are committing one of the greatest medical crimes of this generation, for a large percentage of the children not only do not need an operation in the epipharynx, but would be far better off without such a procedure. Under the usual methods of examination it is easier for the overworked men in the clinic to pass on to the operating room these cases than to carefully examine them and disagree with the school physician; but I believe we should select all doubtful cases and have two or three men in the clinic pass upon them, and then, if thought best, refer them back to the school physician, stating that at time of examination we did not deem operation advisable, but would like to again examine the patient if symptoms should ever arise suggesting nasopharyngeal disturbances. There can probably be no cause for discussion concerning the advisability of removing a large central adenoid mass which hinders respiration or presses upon the cushion, or overlies the pharyngeal orifice of the tube, but in these cases great care should be used to avoid injuring the cushion of the tube while removing the adenoid tissue, and our whole duty has not ended with the operation, however skillfully performed. These patients should be examined within a few weeks after the operation, to learn if there has been healing without adhesion or other deformity. If we can impress the advisability of this examination upon the guardian of the patient, as well as upon the medical profession in general, we shall have done much to protect our patients against evil or unsatisfactory results which sometimes follow the operation for the removal of adenoid hypertrophy.

One of the reasons for presenting this subject is to ask: Have our methods of examination in the past been such as to enable us to so carefully diagnose the conditions in the epipharynx as to tell what cases need surgical interference and what cases will best be cared for by other means? In marked cases we can say, yes; but in a large number of cases we must say, no. With the nasopharyngoscope it is possible, in the majority of children over four years of age, to inspect the epipharynx while at rest and during the act of deglutition. This has been of great assistance and satisfaction to me in all the cases where the nasal passage was sufficiently large and the child was under control, but in younger children, and in those who are timid and cannot be controlled, it is frequently difficult, and sometimes impossible, to pass the pharyngoscope through the nose. The epipharyngeal space is small and the digital examination is frequently misleading, even with a long, slim finger. In these cases it is usually impossible to satisfactorily examine with a postnasal mirror, for the child in resisting and crying closes the pharynx from the epipharynx. I have been very anxious to examine these little patients as I could older ones, for the knowledge gained by vision is usually much more definite than that of speculation or even that of palpation. Last spring I devised a tubular speculum which can be slipped behind the soft palate, and by sliding the retractor it will carry the soft parts so far forward as to expose the whole epipharynx. The nasopharyngoscope, passed into the speculum, lights and gives a view of the entire epipharynx. This method is not as good as the one of passing the endoscope through the nose, for there must be some distortion produced by any instrument which draws upon the palate. It is not possible to observe the effects of deglutition, but it is an advance and a great aid in the examination of those cases which cannot be examined through the nose. It shows perfectly the amount and location of the adenoid, its relation to the tube, the general condition of the pharyngeal end of the tube, and the condition of the posterior ends of the turbinates. It can be used by any one of ordinary ability, and little more time is necessary than for the use of a tongue depressor in the inspection of the pharynx. With the patient's head held firmly by a nurse or assistant, and with a gag between the teeth, it is possible to use this instrument even in a resisting child.

In a great many cases where there is a low type of middle ear disease, and where there is some obstruction to normal breathing, and where without special study of the case we would be tempted to advise immediate adenoid opration, we are able to so change the habits and hygiene of the child as to get relief of the existing interference and to prevent the liability of its recurrence. It is surprising how quickly epipharyngeal disturbances will arise as soon as the patient is subjected to the overheated and excessively dry air of our modern heated and often poorly ventilated rooms; and it is equally surprising how quickly such a patient will improve as soon as more moisture is added to the living, and especially to the sleeping, room. We have all seen children with epipharyngeal hypertrophy, with the associated and resulting symptoms, after having lived in unhygienic surroundings during the winter, go in the springtime out into the open country and sleep in the normally moist air, and begin to immediately improve in their symptoms. An examination of these cases in the autumn frequently finds no pathologic condition. We realize that there are many children coming to our clinics from very poor surroundings for whom little can be done to change the unhygienic mode of living; yet in these cases we may be able to accomplish something through the aid of the social service workers. Efforts in this direction are often more important for these unfortunate little patients than the simple operative measures performed more or less as a matter of routine. In all of these cases where there is any doubt as to the advisability of operating for adenoid or other nasopharyngeal conditions, the time which would be necessary to carry out the operative procedure will in most cases be sufficient to place them in the proper departments for special investigation, and many can be given relief for the existing conditions.

Many cases of epipharyngeal inflammation and hypertrophy are due to separate foci within the nose, and are relieved by treatment of the existing nasal disease. Deformities within the nose are frequent etiologic factors in producing epipharyngeal inflammations and hypertrophies, and their correction often results in the relief of these conditions. Too often we see, especially in children, operative procedures within the epipharynx when the fundamental cause of all existing trouble is within the nose. A good view of the posterior nares will often give a clue to the etiologic role played by the nose. If there is a marked hypertrophy of the posterior ends of the turbinates, or if there is a purulent secretion flowing over them, we can often find the source of the trouble within the nose. Until these causes are relieved we cannot expect any permanent relief of the resulting pathology within the epipharynx.

Having considered the general associations of epipharyngeal disease in children, now we come to the subject of therapeutics, which naturally divides into that of general and local. Although the general therapeusis is frequently fully as important as that of the local, it has to deal with the treatment of so many systemic conditions which may act as etiologic factors in epipharyngeal disturbances, that it is too extensive to be discussed here except in a very general way. Gastro-intestinal disturbances must receive attention. The epipharynx in children, as well as in adults, is almost always affected by attacks of indigestion and constipation; and diet, together with measures to regulate and so far as possible correct these defects, is of great importance. Malnutrition and anemia are not always the result of epipharyngeal inflammation and swelling, but are often etiologic factors in these conditions. This fact should be kept in mind, as we should not subject these patients to local treatment until we have carefully studied their general condition and have eliminated as far as possible all contributing causes.

Children who are subject to acute epipharyngeal inflammations should be warmly but not excessively clothed. They should be given all the fresh air possible, but they do not withstand excessive draughts of air, especially while sleeping. They should be given sufficient exercise, but more care is often necessary with them when they are at play than with the child of greater resistance. They must be more careful after becoming heated not to sit in draughts or lie upon damp cold ground. It is often difficult to decide how much care to exercise in any case. We must not coddle them too much, nor should we make them too apprehensive of trouble every time they happen to be exposed to draughts or other unavoidable exposure. We must try to gradually harden them to exposure, but nothing is gained if we carry our hardening methods beyond a point followed by healthy reaction. In the anemic and frail child who is very prone to frequent and often severe attacks of epipharyngeal inflammation, as well as in those who suffer from a chronic condition, the syrup of iodid of iron is often of considerable service.

The infections of the epipharynx, being almost always associated with similar infectons of the nose, and frequently assocated with like oropharyngeal infections, often demand simultaneous treatment with these adjacent cavities. In epipharyngeal infections, as aural complications are frequently of great importance, it is essential that early treatment be applied which may prevent severe aural extension. In the early stages of congestion of the nose and epipharynx the patient, if possible, should be placed in a room with plenty of warm moist air. A small dose of Dover's powders, with some hot drink, often aids by stimulating the skin to greater activity. A saline, or a dose of oil is advisable, especially when the child is inclined to be constipated. In young children we must generally advise against the use of douches, even when there is hypersecretion, as there may be more danger of injuring the eustachian tube and ear than of protecting them against the advance of the infection. Steam with the vapor from tincture of benzoin may be of service. A spray of benzoinal and resorcin is often efficacious. Heat applied to the sides of the neck near the maxillary angle is of marked service in allaying many of the acute epipharyngeal congestions. Often very satisfactory results can be obtained by applying to the nose anteriorly an ointment of hydrastin muriate, gr. 3; menthol and eucalyptol, each gr. 7: and lanolin oz. 1. Only a small amount of this ointment should be applied at one time, and three applications are sufficient for a day. A 10 to 20 per cent solution of argyrol applied to the epipharynx, either by the eustachian tube or by dropping through the nose, has been found to produce very satisfactory results in a large number of these cases. Where these inflammations are accompanied by marked swelling and with extension into the tube and ear, and where there is complete blocking of the tube with the resulting middle ear inflammation, whether or not there is secretion within the middle ear and bulging of the membrana tympani, quick relief of the ear condition can usually be obtained by injecting a solution of cocain and adrenalin into the eustachian tube, and following this after a few minutes with an injection of argyrol. In young children, or in older children who rebel against treatment, we sometimes find it hard to use the eustachian syringe. In these cases the patient's head can be held in the Rose position and tilted toward the affected ear, and the solutions can be dropped through the nose and allowed to flow toward the orifices of the tube. It is much more satisfactory, where possible, to use the syringe under the guidance of vision. This is true in regard to all treatment of the epipharynx, especially when working about the orifice of the eustachian tube.

Chronic epipharyngeal inflammation may produce a simple hypertrophy, with or without purulent secretion, or may go on to atrophy of the mucous membrane and to the underlying structures. Except in the after-results of severe epipharyngeal diphtheria, it is very rare to find an atrophy of the mucous membrane in young children. The chronic inflammations are frequently associated with or due to septic nasal inflammations. In chronic epipharyngeal inflammation, even in young children, we must not forget syphilis as a possible etiologic factor. Chronic purulent epipharyngitis in young children is often very hard to treat. It is frequently the result of a chronic purulent condition somewhere within the nose which it is impossible to definitely locate.

In all our work within the epipharynx, whether for exploration or treatment, we must use great care, for the mucous membrane of this area, especially that covering the eustachian tube, will not withstand harsh treatment, and much injury may follow careless treatment. In cases where it is necessary to remove bands or growths in the lateral fossa, or to treat any pathologic conditions about the orifice of the eustachian tube, it is possible to proceed with greater precision when the operative field is under vision. This is accomplished when possible by passing an endoscope through the opposite side of the nose, and the operative instruments through the same side as the lesion to be attacked. Dr. Yankauer has demonstrated the direct method of attack through his direct speculum. In a recent paper, Dr. Beck has described a method of attack, operating upon the epipharynx under direct vision. He passes a rubber tube through both nostrils and then carries the ends through the mouth. By applying traction he lifts the soft palate forward. I have not had sufficient experience with this method to pass judgment upon it, but thus far I have been unable to view the cushion of the tube or the lateral fossa. In very young children it is frequently impossible to operate upon or treat the epipharynx under vision by the aid of the endoscope. The nasal passages are frequently too small, and it is impossible to keep the patient sufficiently still. I am of the opinion that this is also true with Dr. Yankauer's tube. I am trying in these cases to pass the curette and forceps by the side of the palate retractor, and then use them in the epipharynx under the guidance of the pharyngoscope passed through the tube of the retractor. As yet I have not developed a sufficiently positive technic to be able to proceed rapidly and accurately, but I hope and believe it will be possible to accomplish this in time. It is fortunate that in the very young, and in older children who have not been subjected to trauma, it is rare that we find adhesions in the fossa or a demand for surgical treatment for the existing nasal disease.

What we most need at present is more proficiency in examining the epipharynx, especially in children, and more conservatism in treating the pathologic conditions found in this space. In order to fulfill these demands it is imperative that we take a wide and comprehensive view of every case before deciding upon the best course to pursue, keeping always in mind that the important object is to prevent aural disease and to relieve as far as possible any existing pathologic conditions within the ear.

XVII.

PAROTID FISTULÆ FOLLOWING MASTOID OPERATIONS.*

By Dr. Corrado Canesteo.

DISCUSSION.

The parotid gland, although deriving its name from the close proximity to the ear, very seldom participates in aural lesions. Pigue and Tonbert have recently called attention to a group of parotides which has an aural origin; that is, this group is concomitant with, or subsequent to, primary infection of the external ear (furuncle of the auricular canal), or of the middle ear (suppurative otitis, mastoiditis). This condition is explainable not only by the simple relations of continuity, but also by the existence of important lymphatic communications. Among the extracranial complications which accompany or follow aural lesions, inflammatory conditions of the parotid are the rarest.

We wish to speak of another complication which is much rarer, that is, the appearance of a parotid fistula following operative procedure on the mastoid, as we had the opportunity of observing the following case:

T. G. B., age four years, native of Genova, with negative family history. Two years ago, at the end of March, he contracted measles, complicated by an acute otomastoiditis which on the 19th of May required operative intervention. The process of healing was regular; but at the lower end of the wound there remained a fistula discharging an aqueous fluid, more abundant during meals. The patient had never complained of any pain or presented any tumefaction in the parotid region.

On inspection of the retroauricular region there is seen an old linear scar, which shows at the inferior extremity a small opening from which issues a transparent, colorless fluid, somewhat opalescent, slightly viscid and a trifle alkalin in reaction. This secretion increases under the influence of the movements of mastication, and becomes especially abundant during meals or when in any other way the salivary secretion is stimulated. About 1 cc. of the liquid can be easily collected, which shows the physical and chemical characteristics of saliva. Cytologic examination shows fine, granular epithelial cells with refractive nuclei, salivary corpuscles, and clusters of mucous cells. The fistulous opening admits a very fine filiform bougie which enters about 1 cm. Inspection of the oral cavity does not reveal anything of importance. Stenson's duct is unobstructed and the saliva drips freely from its opening.

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*From the Institute of Special Surgical Pathology of the Royal University of Genova (Director, Professor E. Bozzi).

In the beginning of the treatment we injected into the fistulous tract a few drops of tincture of iodin, and later we used galvanocauterization; but obtaining no results from these methods we introduced a small quantity of Beck's paste with a fine blunt needle. After two of these injections the fistulous tract was closed permanently. It is now months since the saliva has ceased to appear.

Now, in discussing the case, how can we explain the formation of the postoperative fistula?

It is known that the posterior surface of the parotid is in close contact with the mastoid process. A small part, lying upon it and its fibrous capsule, is very adherent, especially at the level of the tendinous insertion of the sternocleidomastoid muscle and of the inferior wall of the auricular canal. Yet the parotid, during operative procedure on the mastoid, from the topographic anatomic point of view, can be considered to lie outside of the surgical field.

Since in our case, the fistula manifested itself immediately after the operation without noticeable inflammatory conditions of the mastoid, we are forced to believe that it was due to an operative wound of the salivary gland. On the other hand, the linear scar, being in its classical position, excludes the possibility that the cause of the fistula was a defective incision. Therefore, we must admit that there was either an anomalous conformation of the parotid that permitted part of the same to cover a considerable part of the external surface of the mastoid, or, rather, that there was an abnormal location on the mastoid of a gland somewhat hyperplastic, on account of past acute or chronic inflammatory processes.

that took a latent course. In that case, the fistula would have followed a lesion of the parotid, due, not to the incision, but to the manipulations in detaching the periosteum, made more difficult by the new formation of very strong adhesions. Even under normal conditions, during this stage of the operation, especially if rough tactics are employed, we cannot entirely prevent lesions of this kind happening. Since these lesions are never reported, we must think that usually they must be so unimportant and followed by such a rapid process of reparation that they completely escape observation. In reviewing the literature I found only a single case of a fistula of the parotid following immediately upon the operative intervention. This case is reported by Kretschman, as follows:

"A male, twenty-five years of age, with a right mastoiditis. Resection of all the process, normal healing of the wound. But after cicatrization, a small circular opening remained at the level of the tip of the mastoid, from which a limpid fluid dripped, which increased in amount on mastication. The opening admitted a small bougie to the depth of 2 cm. toward the inferior wall of the canal.' After a few unsuccessful attempts a cure of the fistula was obtained twenty-two weeks after the operation by repeated cauterizations with silver nitrate."

There are four other cases in which fistulæ appeared much later. These are:

Case 1 (Kretschman).—Girl, ten years of age, was operated on the right mastoid. Cicatrization in eighth week. Three months after operation, following a blow, a fistula appeared, without swelling, at the lower part of scar, from which dripped a colorless fluid which increased at meal times. The probe showed the direction of the fistula to be toward the inferior wall of the canal. Silver nitrate cauterization was repeated, with healing on tenth day.

Case 2 (Combier).—A. O., age ten years, with an intermittent otorrhea since age of three. For three months he had a swelling of the mastoid region, especially at the level of the tip of the apophysis. Incision and curettement. Cicatrization in one and one-half months. A month later, all pains were relieved and a small fistula appeared at the inferior part of the scar, from which issued continuously a watery fluid which increased during meals, with a feeble reaction to per-chlorid of iron. A needle, mounted on a syringe (Pravaz), containing tincture of iodin, was injected into the orifice. Cure was obtained on a single injection, with a slight local reaction.

Case 3 (Combier).—L. R., age twenty years, operated on the 30th of May, 1907, for a right mastoiditis. Wide opening of the tip and exploration of the digastric fossa. Cure in three and one-half months. The following month he complained of pain on the right side of his head and a sensation of tension at the inferior part of the scar. A small opening then appeared, from which issued a clear fluid, and pain ceased. Fistula closed and reopened again, three weeks later, but again closed. After eight months, however, two years after the operation, the discharge became continuous. Patient entered hospital in June, 1909. Fluid which was obtained had the character of saliva. Permanent cure was effected by the injection of tincture of iodin.

Case 4 (Combier).—H. M., age thirty years, entered November, 1908, with an otomastoiditis—a chronic suppurative otitis media. The following day petromastoid region was opened. A purulent collection evacuated. Cicatrization completed in February, 1909. The patient complained, only from time to time, of pain on the left side of head, with a sensation of weight under the ear. During the month of May, 1909, while eating, there issued a fluid at the inferior part of scar, with salivary characteristics. A few drops of tincture of iodin were injected, and healing was obtained with slight local reaction.

Combier excludes the idea in his cases that it was due to a secondary infection of the parotid, or of a suppurative parotitis—for this is an exceptional complication (Duplay and Charasse)—as there were no symptoms of parotitis. He, instead, ascribes the formation of these fistulæ to operative wounds of the glands which healed while the bone was suppurating. Thus, the lobules of the gland, so denuded, would have undergone a slight process of sclerosis, partly due to contiguity with the mastoid wound, and partly due to a latent inflammation of its excretory duct, followed by temporary obstruction of the same. The newly formed pocket, which could not evacuate itself by its excretory duct, situated immediately under the skin, would break through it, either following a trauma or on account of a complete obstruction of the excretory canal. Thus, he could explain the intermittence of the pain and the sense of tension that vanished with the appearance of the fluid.

The course of these fistulæ has been in all cases very simple, and they have yielded easily to treatment. However, in our case, the injections of the tincture of iodin and the galvanocauterizations, which usually prove successful, were insufficient. It was then that we conceived the idea of trying Beck's paste, which we were using to influence fistulous tubercular tracts, and healing followed rapidly and completely.

Since, to my knowledge, Beck's paste has never been before used in the healing of salivary fistulæ, having obtained such a result, I deemed it opportune to report my case.

XVIII.

FISTULA SYMPTOM IN NONSUPPURATIVE DISEASES OF THE EAR.*

By Oscar Beck, M. D.,

Vienna.

The assertion can now confidently be made that it is very rare to find cases in which an accurate functional examination of the inner ear has been carried out, where operation reveals a previously unrecognized labyrinth fistula. This excludes, naturally, those cases in which there is a complete abolition of reaction of the labyrinth to every irritation.

On this account those unusual conditions of the vestibule are the more interesting in which movements of the eyeball are obtainable through increased or diminished air pressure in the external auditory canal, although the most careful inspection of the inner wall of the middle ear has been carried out during operation without revealing any fistula or other anatomic explanation for the occurrence of these artificially produced movements. Alexander, LaSalle, Bárány, Ruttin, E. Urbantschitsch, among others, have reported well authenticated observations of this kind. In all these cases, however, there existed suppuration of the middle ear, or there were, as in the cases reported by Alexander, easily demonstrable remains of a previous otitis, such as perforations in the drum membrane, cicatrices, etc. Hennebert and Buys, and later Alexander, have reported movements of the eye in patients with hereditary syphilis and nonsuppurative middle ear disease, which could be excited by the performance of the fistula test. The original report of the interesting cases of Hennebert were unfortunately not accessible. Before I take up in detail the vestibular condition of my cases, I wish to refer to the most important points in their clinical history.

Case 1.—Hereditary syphilis. The father of the patient, a girl of eleven years, was married three years after the primary infection. His wife had had two miscarriages. The patient was an eight-month child, and was always delicate, without ever having been seriously ill. When eight years old there developed an affection of the eye that was treated locally with mercury by inunction. For about a year the parents had remarked a diminution of the hearing, although the child was very intelligent. For the last four months she had complained of subjective noises in both ears, on the right side more than on the left. These were described as resembling a whistle, which occurred at times, especially when excited, lasting several hours, then entirely disappearing for several days. She had never had vertigo nor vomiting, and there was no uncertainty in her gait.

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*Translated by Thomas J. Harris, M. D., New York City.

Status Praesens.—The nerve and internal condition were negative. In the left eye there were the remains of a keratitis parenchymatosa. Wassermann positive.

Condition of the Ear.—Drum membrane, both sides showed slight catarrhal alterations. Weber positive to the left; Rinné, both sides positive; diminished for air and bone conduction; much stronger right than left. Perception of the high tuning forks on both sides decidedly diminished. Right ear, conversational voice, 1 meter; whispered voice, 0; left ear, conversational speech, 5 meters; whispered voice, 2 meters. Spontaneous nystagmus toward the right and left, but not always present. Caloric reaction (26°), both sides normally present. Turning reaction, ten times right, thirty-five seconds; ten times left, fifty seconds. Nystagmus after rotation to the left much stronger, with marked vertigo and nausea. On account of the changing spontaneous nystagmus, no examination was made with the galvanic current. Neither aspiration nor air compression in the left external auditory canal caused any change in the bulbi. Air compression in the right external canal caused both bulbi to move slowly to the right canthus and return slowly again, on the letting up of the compression, into the middle position. Air aspiration caused both bulbi to move slowly to the left. Light vertigo followed the compression.

I demonstrated this patient in one of my private courses on syphilis of the ear, and my attention was accidentally called to this interesting phenomenon. Only as the result of the thoroughness of a labyrinthine examination, which demonstrated the presence of the fistula symptom, was my attention called to this peculiar phenomenon. The patient remained three weeks under observation. During this time she was given a course of mercurial inunctions. The labyrinthine condition was demonstrated by me a number of times. Later the parents departed with the child for their home. Since that time I have not seen the patient.

Case 2.—Acquired syphilis. History: A. N., age thirty-two years, four years previous to being seen had acquired a primary lesion and was treated lege artis at the skin clinic. With this exception he had never been sick. The patient never complained of ear trouble. He stated that for the past two months he had suffered from a sensation of vertigo and unsteadiness in walking, especially in the dark. He had the tendency in walking to bear to the right, but, also, at times, toward the left. Quick movement of the head intensified the feeling of dizziness. He is not able to turn around, but always instead makes a curve. The hearing has diminished in the right ear.

Status Praesens.—The eyes, the general condition, and that of the nerves, with the exception of a slight increase of the patellar reflex, were negative; in the right axilla a circinate syphilid—Wassermann strongly positive.

Ear Condition.—Drum membrane, both sides normal. In the left side the process of the incus is visible. Left ear, normal hearing. Right ear, conversational speech, 4 meters; whispered voice, 1 meter. Weber lateralized to the left. Rinné, right, positive; air conduction slight; bone conduction decidedly diminished. Right side, lowering of the upper tone limit. Vestibular apparatus, spontaneous rotatory and horizontal nystagmus toward the left by looking to the left; very slight by direct view; negative by looking to the right. Eyes directed upward or downward, negative. Romberg, pronounced swaying of the entire body without falling in any definite direction. Change of the position of the head has no perceptible influence in the direction of the swaying. The left ear, caloric (26°), normal reaction. In the right ear, after a few seconds of irrigation, there developed pronounced nystagmus of the third grade to the left; the patient became pale, perspiration appeared on the forehead, pronounced nausea. This nystagmus lasted almost two and a half minutes and then gradually diminished in intensity. Rotation reaction, ten times right, forty seconds; pronounced nystagmus with vertigo; ten times left, one minute forty-five seconds; exceedingly severe nystagmus with nausea and pronounced vertigo. When the patient's head is quickly turned toward the right shoulder there develops a marked nystagmus associated with much vertigo. Compression of air in the right auditory canal gives a rotatory and horizontal nystagmus to the left; aspiration a similar nystagmus to the right. The compression nystagmus is much stronger than the aspiration nystagmus, and the feeling of vertigo is also more pronounced. I was able during a period of two weeks to excite this phenomenon. The patient was treated with injections of calomel. He has disappeared from observation, so I have not been informed regarding the outcome of his case.

We have, then, two patients in whom movements of the eyes could be effected by compression or aspiration of air in the external auditory canal. The little girl with the hereditary lues showed with compression a slow movement of both bulbi, the man with the acquired syphilis, a fistula nystagmus with rotatory and horizontal components. The quick rotatory component was directed by compression to the healthy side, by aspiration to the diseased side. It corresponded, therefore, to that type of fistula symptoms which we designate as inverted fistula symptom. In neither of these cases was any history of suppuration obtainable, and the condition of the ear drum spoke against such a possibility. The question accordingly arises, how is it possible, in the absence of suppuration, with an intact ear drum and presumably intact ossicular chain, to produce bulbus movement through increase or decrease of the air pressure in the external auditory canal? According to Alexander there are three possible explanations. First, in the intensity of the air pressure increase; second, in the favorable or unfavorable circumstances through which this increase of pressure can be transplanted into the labyrinth; and, finally, in the irritability of the labyrinth itself. The intensity of the air pressure increase scarcely can enter into consideration. I believe, with Alexander, that we can exclude this, since in all of our investigations in the clinic we always made use of the same size balloon and of an olive which accurately closed off the auditory canal, so that the difference in the pressure in all the cases would be virtually the same. Alexander, in his own material, did not find a single case in which, as a result of the increased irritability of the labyrinth, it was possible to get a compression nystagmus.

The factor of increased irritability of the labyrinth seems to me not important for the explanation of this nystagmus, because we can demonstrate that an increase of the pressure in the auditory canal, which under normal conditions in the inner ear can produce no effect upon the vestibular apparatus, can in a very sensitive vestibular apparatus irritate it and call forth a nystagmus movement.

In Case 1 there existed on both sides a normal irritability for the thermic test. On the other hand, rotation reaction produced in the diseased ear in each case a nystagmus lasting fifty seconds. In Case 2 we find an unmistakable increased irritability for cold and warm irrigation, and a rotation reaction giving in each case a nystagmus of almost two minutes, accompanied by pronounced subjective symptoms. Both cases showed an increase in the reaction for the rotation test.

Now, the turning reaction has a decidedly greater effect upon the lymphokinetic apparatus, and also the fistula test represents a mechanical force working on the endolymph. We know from a large number of observations, as well as from the studies of Ruttin on serous labyrinthitis, that in pathologic cases the caloric reaction loses its effect with relatively slighter changes than does the turning test, and the fistula test is lost first with pronounced changes. The fistula test, therefore, produces not merely a pure mechanical action on the endolymph, but represents also the strongest stimulus which we are able to bring to bear upon the labyrinth. These two factors in conjunction with the increased irritability for the turning test are sufficient to explain the compression and aspiration nystagmus met with in a normal drum membrane.

When we come now to a causative relationship between the abnormal irritability of the lymphokinetic apparatus on the one side, and the positive reaction for the fistula test with an intact ear drum on the other, one circumstance demands further explanation. When does only a slow movement of the eyes arise, and when does a vestibular nystagmus take place with rapid and slow components? Ruttin has given the following explanation in purulent diseases of the middle ear, to clear up the question when we are able to produce by the fistula test merely a deviation, and when we can produce a typical nystagmus:

When, as a result of favorable pathologic anatomic conditions (i. e., the size of the fistula and the free channel for the compressed air stream), the irritation is great, then there results from the vestibular irritation, which causes a slow movement of the eyes to the opposite side, a central reaction in the form of a quick reverse movement. This gives a nystagmus to the same side. If, however, the irritation produced by compression is, as a result of unfavorable anatomic conditions, slight, then no central reaction follows the vestibular irritation, but first a slow reverse movement on the cessation of the irritation.

The most important of that which we regard as favorable or unfavorable anatomic conditions (i. e., the size of the fistula and the free accessibility of the compressed air) is, in the last analysis, the greater or less effect of the irritation on the endolymph; that is to say, on its locomotion. In cases with normal middle ear, this is virtually lacking, as I have already mentioned. Nevertheless, I regard the opinion of Ruttin as the most plausible explanation for my cases also. The analogy of a favorable form of irritation is found in my second case, which gave a typical fistula nystagmus, shown in the increased irritation wave for all stimuli; while the patient with the congenital lues, who showed a slow deviation, was positive only to the turning action, and showed no increase for the thermic test. This patient also had no nystagmus attacks, which were producible in the other case by bending the head. Bárány believes this phenomenon to be retrolabyrinthine in origin, and everyone who has examined nervous patients and tumors of the vestibular apparatus, agrees with this explanation. When, however, as Breuer has shown, one or two movements of the head are sufficient to produce violent nystagmus, we must believe that with such an abnormal irritability of the labyrinth it is not always central in origin.

The question where upon the lateral wall of the labyrinth the air compression or aspiration produces its effect, belongs for the most part with the question regarding the increased mobility of the stapes; that is to say, with the much discussed question regarding the existence of the stapes fistula. Bárány showed a patient in the Austrian Otological Society with positive Wassermann, who had acquired syphilis twenty-two years before. For ten years he had suffered from difficulty in hearing in his right ear, with tinnitus and vertigo. The functional test gave a slight alternating spontaneous nystagmus. Movements of the head produced no nystagmus. The caloric reaction was diminished on the diseased side. The turning reaction gave about twenty seconds on both sides. Slight movements of the eyes were demonstrable with compression and aspiration, and were accompanied by vertigo. Bárány asks whether this arises from increased irritability of the labyrinth, or from an abnormal mobility of the stapes, as the result of syphilitic periostitis of the labyrinth. From the circumstance that the patient at times suffers from vertigo and at times is free, while the movements of the eyes are always of the same intensity, Bárány believes that we have to deal with an abnormal mobility, since if an increased irritability were the cause, it would be necessary to assume that the vertigo changes according to the subjective condition of the patient.

In cases of abnormal mobility of the stapes we have to deal according to Bárány, not with a nystagmus, but slow movements of the eyes. Alexander, on the other hand, believes that a compression nystagmus from fistula symptoms should be differentiated by the fact that in every case of labyrinthine fistula there is in the beginning of the formation of the fistula the history of a characteristic vertigo. Whether and how far the argument of Alexander has justice in it, would call for more discussion than the extent of this article would permit. In any case, however, this differential diagnostic factor concerns itself primarily with purulent processes. Alexander's explanation was intended only for such, and in my case with normal middle ear, it scarcely can be taken into consideration. It is my opinion that an abnormal mobility of the stapes is in all these cases of normal middle ear the chief explanation for the phenomenon, both of the slow movements of the eyes and the typical fistula nystagmus, since the anatomic conditions on the inner wall of the ear seem to speak against the possibility that any other place can be regarded as the point of attack for the irritation. Both cases showed, also, more pronounced subjective and objective symptoms by compression than they did by aspiration.

When, however, only slow deviations and when typical nystagmus will result, appears to depend upon the particular conditions producing the irritability in the labyrinth; peculiar conditions of irritability which can be demonstrated in a number of cases of hyperirritability, but need not necessarily be present. This Bárány has shown in the case of diminution of the caloric reaction and a turning reaction of twenty seconds' duration. Only slow movements of the eyes existed. The case of Alexander, on the other hand, with hereditary lues, showed, with the caloric irritability preserved, a lack of response to the turning reaction, and in spite of this, as the result of the fistula test, a very pronounced nystagmus. It requires no further comment to see that we have here a particular and entirely atypical condition of irritability in the vestibule, since we are accustomed with pathologic conditions to see a weak caloric and then a strong irritation test disappear. At the April meeting of the Austrian Otological Society this year I demonstrated a child with congenital syphilis, who showed, nevertheless, a positive reaction to the fistula test. There was complete deafness on the diseased side and lack of response to the thermic and turning reactions. In spite of this, central vestibular reactions were preserved and could be demonstrated by the turning test, and a contradictory sensation was produced in all our examinations.

This case, which I have not reported in the previous work, shows that in syphilis very complicated conditions are met with in the labyrinth, and that these marked changing pathologic conditions, at least in this group of cases, can produce their effect pronouncedly on the labyrinthine fluid.

XIX.

A CASE OF PROBABLE INJURY TO THE JUGULAR BULB FOLLOWING MYRINGOTOMY IN AN INFANT TEN MONTHS OLD.*

By John Randolph Page, M. D.,

New York.

This case was admitted to Dr. Duel's service at the Manhattan Eye, Ear and Throat Hospital last July, with a discharge from both ears of six weeks' duration, temperature 102.6° and considerable digestive disturbance. The house surgeon, Dr. Gallivan, found both drum membranes bulging posteriorly, so he performed a double myringotomy, the baby being swathed and no anesthetic used. After the myringotomy on the left side a profuse hemorrhage occurred; so profuse that it was thought best to pack the external auditory canal to control it. After this the child bled from the nose for a few minutes. On removing the packing at the end of five or ten minutes no further hemorrhage occurred. The ears were irrigated every three hours and the child kept under observation. The temperature, after a slight rise, gradually fell to 100.4,° but twenty-four hours later went to 105.° The attending physician, Dr. Sammis, reported some enteritis with the ear condition and ordered treatment accordingly, but the temperature continued to rise to 105° every night, in spite of apparent improvement in the ears and in the intestinal condition.

Blood examination showed no malaria, 14,000 leucocytes, 74 per cent polynuclear neutrophiles, but sufficient quantity could not be obtained for culture. Possible infection of the left jugular bulb was thought of from the first, but the extreme youth and delicate state of the patient made us particularly loth to operate unnecessarily. On the third day after admission, however, as the temperature the night before had again gone to 105,° the child was sent to the operating room for the purpose of having her left jugular resected, although there was practically no discharge from either ear and the skin over the mastoids was thin and entirely free from edema. The intention was to open the mastoid merely to block off the sinus and prevent return flow of infection from the bulb, and then, as rapidly as possible, to ligate and resect the internal jugular. To our surprise, on incising the thin skin over the mastoid, we found the cortex of the bone darkened, and when this had been removed, the antrum and cellular structure over the knee of the sinus filled with creamy pus, cultivation from which showed streptococci. The extensive involvement was so unexpected that operation on the other mastoid was now considered rather than operation on the jugular, as the external signs in it were just as sufficient to warrant operation as they had been on the side just exposed. Accordingly, the right mastoid was opened and practically the same condition was revealed. There was no exposure of the sinus or dura, as sufficient cause for the septic temperature was thought to have been found. On the following morning the temperature reached 105.8° and during the following night 105,° so the next day it was again decided to remove the left jugular. The sinus on this side was exposed and incised, but no attempt was made to demonstrate a flow of blood from the bulb. Because of the infant's tender age it was packed quickly after incision and obliterated without an appreciable loss of blood. The jugular was then excised, but not without delay and embarrassment, owing to the large number of lymphatic glands which are always present in the neck of a child of this age, although they were not very much enlarged nor apparent until after the incision was made. Nothing pathologic could be noticed macroscopically in the vein itself, and it appeared to fill readily. As the neck was naturally short, the whole exposure was hardly more than an inch. The vein was ligated and excised, filled with blood, but unfortunately was not properly preserved for examination. The temperature the following day did not go above 104,° and after that it gradually subsided to normal, with an uninterrupted recovery of the patient.

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*Presented before the Section on Otology, New York Academy of Medicine, November 14, 1914.

Since Dr. McKernon in 1905 called attention to the occurrence of primary jugular bulb thrombosis in children with purulent otitis media, and the close relation anatomically of the bulb to the floor of the tympanum, a number of other men have reported similar cases. In a short search in literature I have found no case where injury to the bulb had been reported after myringotomy, although I know of an instance where injury to the bulb occurred during the radical operation. It seems singular on observing temporal bones from children of this age that such injuries are not more common after myringotomy, particularly as high bulbs with a little if any bony separation between them and the tympanum are not infrequently met with. There is, I think, reason to believe that there was injury to the bulb following the myringotomy in this case, and consequent infection of it, although there is of course no definite proof that this was the case.

XX.

COUNTRECOUP FRACTURE OF THE SKULL.*

By T. R. Chambers, M. D.,

Jersey City.

Mrs. S. V., aged sixty-four years, had in 1888 six days of O. M. P. R., but the ear was dry afterwards.

March 19th last, three months ago, fell from ladder on porch, a distance of eight feet, to sidewalk, striking left temporal and occipital regions, sustaining a probable fracture of skull (diagnosed at the time as on the left side, where there were a subscapular hematoma and some superficial lacerations of scalp). She was unconscious for a half hour. She recovered, but complained for five days of pain in the right mastoid region. For three months she was well.

On June 16th a dentist was consulted for a dull pain in a tooth on the right side, radiating posteriorly. The dentist could find nothing to do for the tooth. Then pain and deafness, but no discharge, occurred in right ear.

June 25th, Dr. T. J. B. Meury was called and ordered hot douching for right ear. July 2d, there had been no sleep for forty-eight hours, owing to pain in right mastoid region, and a temperature which had been two figures, suddenly rose to 103.8.° There was also pain in right shoulder. She reluctantly consented to enter Christ Hospital. She was seen by me immediately on entering. She walked, talked perfectly and rationally and read print; had no nystagmus nor dizziness. The auditory canal was not swollen, nor did the tympanum show disease except slight injection. There was no pain on pressure over mastoid antrum or tip, but there was pain on pressing on a firm tumor the size of a walnut, which was seen posterior to the mastoid. My first impression did not realize the seriousness of her condition, and I was inclined to use expectant treatment before operating—perhaps the next day. But the temperature being taken and found to be 104.8,° she was immediately placed on the operating table, after preparation and the administration of a hypodermic of morphin and atropin. She took the anesthetic kindly. A rather wide mastoid incision was made, and this incised across its center. This cross incision divided the tumor, which was firm and seemed to have existed many days. A few drops of pus came from the mastoid body, but the antrum was clean, as was also the iter ad atticus. Immediately under the tumor growth was found softened bone, and a few drops of pus exuded from a crack in the bone. This fracture was an inch in length, extending from the occipitotemporal junction forward. The bone was spooned out and a cavity large enough to admit the first phalanx of the little finger was found, where evidently had been an epidural hematoma. When all diseased bone had been removed a large opening existed which included the opening made in the mastoid body. The floor, made up of the pulsating cerebellum and sinus, looked healthy and everywhere resisted gentle probing. Iodoform gauze was lightly packed in the space and a few stitches taken superiorly, but free drainage allowed. The patient did not come out of the anesthetic for ten hours. The temperature fell two degrees for a few hours, then steadily mounted to 105.8.° There were terrible pains complained of between attacks of coma. The next day, on removing the dressings, they were found dry, and the wound looked black with no attempt at repair. The patient died eighteen hours after operation. Postmortem examination was refused.

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*Presented before the Section on Otology, New York Academy of Medicine, November 14, 1913.

RETROSPECT.

1. What connection was there between the toothache and the beginning of symptoms?

2. The remarkable toleration shown for three months for the large hematoma which gave no symptoms—or rather none were recognized.

3. Attention was misdirected by the left sided injury seen; and the importance of the right sided injury, because unseen, failed of recognition.

If a simple trephining had been done early, and the fractured bone and hematoma removed before they had begun to break down, the life of the patient would have been saved.

XXI.

CANCER OF THE LARYNX WITH SPECIAL REFERENCE TO RADIUM THERAPY.*

By Joseph C. Beck, M. D.,

Chicago.

There has no doubt been a great deal more interest aroused in the cancer question, especially among the laity, in the past two years than in the ten years previous, and it appears that the tremendous agitation in tuberculosis has had a great bearing on this. It is certain that this agitation had very definite and beneficial results in reducing the mortality from tuberculosis, as well as the spread of the tubercular disease itself. By applying the same amount of enthusiasm in attacking cancer from all sides, especially by the education of the laity and the early diagnosis by physicians, we may hope to bring about results which up to the present time are entirely wanting. It appears from reports in general as well as those of laryngologists, that carcinoma is on the increase. I am inclined to agree, by reason of my experience, with the opinion that this is only an apparent increase, inasmuch as better methods of diagnosis are invoked for carcinoma, and the differential diagnosis for lues, tuberculosis, rhinoscleroma, etc., and carcinoma is easier of accomplishment.

The second session of the Clinical Congress of North American Surgeons, when a special committee was appointed to formulate methods of gathering all possible data to fight this terrible malady of cancer, has had a marked influence in promoting the possibility of accomplishing some good. At the last session, the discussion all tended to the early diagnosis and early operation, concluding that thus far the only chance in saving any case was by means of early thorough surgery. An important suggestion was made in the direction of enabling one to make a correct report of the ultimate result of cases operated upon. This consisted in what is termed the "follow-up system." After a patient has recovered from the operation and has been discharged, he is informed that when he receives a stamped envelope from the doctor, he is to answer the questions and return at the earliest convenient time. The stamped envelopes with record sheet questions are sent out at definite periods of three months, six months, one year, two years, five years after operation, and after that as often as one wishes to know how that patient is getting on, with special reference to recurrence. The question of ethics in this matter should be waived in favor of the possibility of having the correct statistics.

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*Read before the Middle Section of the American Laryngological, Rhinological and Otological Society, Detroit, February 23, 1914.

In regard to cancer of the larynx, I believe there is not much difficulty in the diagnosis, in the presence of the cardinal symptoms of persistent hoarseness, particularly in older men. Yet in every instance a differential diagnosis as to lues, tuberculosis, rhinoscleroma, sarcoma and other neoplasms should be made by laboratory methods especially, before resorting to the removal of particles of tissue for microscopic examination to confirm the diagnosis. Why males should be more frequently affected is not definitely known, but the writer believes that the greater likelihood of exposure to irritants with greater reaction due to the stronger development of the muscular apparatus of the larynx may have something to do with it. The fact remains that I have observed one hundred and seventeen cases of carcinoma of the larynx, and only two were in the female. I performed laryngectomy on one of these eight years ago, and she has had no recurrence. Although the case was diagnosticated carcinoma clinically as well as by microscopic examination, I am at times inclined to believe that perhaps there might have been a mistake in the diagnosis.

The type of carcinoma most frequently found is the epithelioma. Crile made a statement a few years ago that carcinoma of the larynx, when operated upon early, gave the best chance for cure of any deep seated carcinoma, because it was contained within the cartilaginous box, and cartilage is very difficult of invasion by carcinoma. His results undoubtedly prove his statement, but his results stand out away ahead of those of any one else in this country. Why is this? I should say it is because the cases are well selected and a perfect surgical technic acquired. My own personal experience with laryngectomy for the cure of cancer is most pitifully discouraging, yet I am confident that this must be due to the poor material that I have had. Most of my cases were quite advanced, with involvement of the posterior or esophageal surface. I have had a fair number of cases in which an early diagnosis was made, but invariably the patients, as well as the physicians referring the case, insisted and urged the more conservative method of laryngofissure, with the removal of the growth within the larynx. The majority of these cases operated upon by the more conservative methods had recurrences, and then implantation recurrent carcinoma was invariably the result, when subsequently a laryngectomy was performed. This is the point that Crile as well as Gluck make, that in order to get the best results the larynx should be removed unopened. I have performed eleven laryngectomies with two recoveries; both are still alive and are without recurrence; one case, a male, sixty-three years old, eight years since operation, and the woman mentioned before, six years since operation. Of the nine deaths, four were within a week or ten days after operation, either from pneumonia or septic mediastinitis. The remaining five died within a year and a half from general carcinosis. I have operated by conservative methods nineteen times; sixteen laryngofissures and removal of the neoplasm, twice by indirect laryngoscopy and once by direct laryngoscopy. Of these sixteen cases of laryngofissure, four are in the group of subsequently laryngectomized, ending fatally. Seven had recurrence and also ended fatally within about one year. Of the five remaining four are alive. The oldest was operated upon twelve years ago. This was a fruit peddler, whose occupation was to cry his wares from a wagon. I removed the entire cord and the ventricular band as well as the tissue below the cord for about one-fourth of an inch. Microscopic examination showed clearly the carcinomatous degenerations (epithelial pearls). Of the other four cases that are still alive, the most recent was operated upon two years ago; he has a recurrence and is one of the cases that I am reporting on in detail, in regard to the use of the radium. Four cases, therefore, of the entire sixteen laryngofissures are still alive and three free from recurrence. While they have no recurrence they are by no means perfect as far as their voices are concerned; all have considerable hoarseness or huskiness. The two cases operated upon by the indirect method date back fifteen and thirteen years ago; both were ideal cases for either laryngofissure or laryngectomy. Both had recurrence. One was operated by another surgeon subsequently by laryngectomy, and died within a week, and the other died of general carcinosis. The one case operated upon by the direct method is too recent to be of any definite value as to ultimate result, but I wish to mention it because the patient is in excellent condition now, three months after operation, with apparently no recurrence. I employed the suspension method of laryngoscopy, and the performance of this procedure was the easiest of any intralaryngeal method that I have ever used. I performed this operation by this route because his relatives would not permit any external operation. As to other methods of treatment, one may enumerate the following, which are at present in vogue, and which I have employed to some extent. I will, however, report on my result from radium at this time, and at some future date the results obtained from the other remedial agents.

1. Radium.
2. X ray.
3. Fulguration and diathermia.
4. Autolytic solution.
5. Colloidal copper and mercury.
6. Trypsin and amylopsin.

In regard to radium, I would say at the outset that I have seen no permanent cure; in fact, there is little encouragement for the cure of cancer of the larynx when the cases usually present themselves to us for this treatment. Yet in the evidence of the remarkable results that are reported in the treatment of carcinoma elsewhere in the body, particularly in the more superficial areas, we must not condemn this most wonderful remedy without giving it a very thorough trial. I am absolutely certain that superficial carcinoma or epitheliomata will disappear, because I have treated such cases with permanent disappearance of the growth. I am also certain that in the carcinoma of the larynx certain gross as well as microscopic changes take place which may be taken as suggestive of destruction of the cancerous tissue. My experience with radium dates back to 1904, when I published my first report.[1] I experimented with a small quantity of radium, being informed that it was sufficient to influence beneficially the growth of cancer. That report I take pleasure in passing, and it will be noted that I stated in the article that I had absolutely no result from its use in carcinoma of the larynx. Since then I know that the information as to sufficiency of the quantity was incorrect; furthermore, the quantity was not what it was represented to me, although I had it tested for radium. After these early experiments I gave up its use, and not until 1909 did I again try to treat a case of carcinoma of the larynx. The patient was a lady, the wife of a physician. At this time I employed a larger quantity of radium, but without any result. The same results followed its use in three other carcinomata of the larynx, and so I again gave up its use and made a report to that effect in February, 1910.[2]

Last year I began to notice some excellent reports, particularly from abroad, on the use of radium in inoperable carcinoma, and the statement was made that much larger quantities of radium were necessary. The radioactivity was found not to be so important as the amount of pure radium—not radium salt—that was employed, although it is only to be utilized in the salt form.

At about this time I had a case of carcinoma of larynx, which I have already mentioned and which I will report in detail. The patient having read and been told of the wonders of radium, preferred to take his chances with radium rather than laryngectomy, and I readily consented to treat him by this method.

The radium that I am employing is the sulphate salt of radium, 19.8 milligram, which contains 10 milligrams of pure radium element. As stated before, it is the quantity of radium element and not the salt that is essential. When we speak of how powerful a dosage we are employing, it does not matter whether it be the sulphate, bromid or other salts of radium that is used; the only difference between them is that the bromid salt is soluble, and the sulphate and others are not. In addition to this quantity (19.8 radium sulphate), I borrowed the radium belonging to Dr. Simpson, of Chicago, 11 milligram of radium with barium, containing 50 per cent radium element, or 5.5 milligram. His radium is imported from the Curie laboratory of France, while ours is the American product of the Pittsburg Radium Company.

Both these radium masses have been tested and are guaranteed to contain the above stated quantities of the element.

I have selected four cases of larynx carcinoma, three only of which, however, are going to be of definite value, as the fourth has discontinued treatment. Yet this fourth case is worth while mentioning, inasmuch as a very interesting phenomenon from the effect of radium was observed in his case.

RADIOACTIVE SUBSTANCES AS RADIUM, MESOTHORIUM AND THORIUM.

As we speak of a Roentgen ray emanating from the Crooks tube, so we may speak of the Becquerel rays when employing radium, mesothorium and thorium.

The qualitative unit measurement of radium is known as a Curie.

There are three groups of radioactive substances considered:

1. Uranium.
2. Thorium.
3. Actinium.

These radioactive substances are constantly undergoing changes and new ones are thus developed. Each of these reformed substances has a different time limit as to existence and radioactivity; for instance, in radium there occurs a division into radium emanation and a substance in ray form, known as helium. This radium emanation again subdivides into rays of radium which are spoken of as radium B, C, D. E, and F.

The time limit of the existence of radioactivity is characterized by what is called "half period limit," that is to say, when about one-half of its activity is lost. So, for instance, the half period limit of existence of radium is spoken of as 2000 years, while the half period limit of radium emanation is only 3.8 days, and that of thorium emanation is 53 seconds.

In the thorium and actinium groups we have:

1. Thorium.
2. Mesothorium I.
   Mesothorium II.
3. Radiothorium.
4. Thorium X.
5. Thorium emanation.
6. Thorium B, C, D, E.

There are three types of rays in these radioactive substances, namely, alpha, beta, gamma, and they all have a different penetrating property. They are also represented in different proportions. The alpha, or the most superficial rays, are at least nine-tenths of the rays present. They are always spoken of as atomic particles of the socalled new element, helium. These rays may be easily filtered, even by thin paper or rubber.

The beta rays are somewhat deeper in their penetration and are analogous to the cathodal rays emanating from the Crooks tube. Some of the beta rays have about the penetration of the alpha rays, that is, not below the skin, while a small proportion have as great a penetration as the gamma rays. One-half of the beta rays, however, can be filtered by a 5 mm. thickness of aluminum plate.

The gamma rays have a tremendous penetrating power. Lead plates of many centimeters' thickness will not absorb all of them; however, there are only a small percentage of these rays present.

Filters are very important in the application of radium, in order to be able to treat different depths, leaving the superficial areas untouched.

The accurate measurement of radium application can be equally as well done as in X-ray, and the "Mache-Unit" is employed, especially in Germany, for this purpose.

The action of these rays on the various tissues has been very carefully studied by Hertwig, and he has found that embryonal tissue especially was markedly retarded in its action, and in many instances destroyed. by radium rays.

Exner[3] has observed the action of radium on subcutaneous cancer, and the following are his findings:

After applying the radium (quantity not stated) for half an hour each day for one week, he finds small necrosis and bleeding in the skin and the underlying tissue. The epithelial cell masses are separated, and newformed connective tissue is seen in the interspaces. The cancer cells themselves do not appear to be changed at first, but later are. Therefore, there are found two types of changes after treatment by radium in cancer, namely, newformed connective tissue, and destruction of the cancer cells. The development of the connective tissue is the most active and earlier than the destruction of the cancer cells.

The preference of radium to the X-ray in many instances is very apparent. It is much easier applied and can be employed in regions where the X-ray tube cannot; as, for instance, it can be placed into the tissue itself for an indefinite period of time.

It also has the gamma rays, which are deeper than any of the rays thus far found generated by the X-ray tubes. The radium employed is, as mentioned before, in the form of salts and not in pure form, either sulphate, bromid or other forms, and it may be placed in capsule, tubes or on varnish plaques. Solutions may be employed of the radium itself, or solutions of radium emanation.

TIME OF APPLICATION.

Usually from one-half hour to two or three hours is allowed at first, but it has been used as long as a week or ten days at a time. The following formula indicates the method of measurement:

10 mg. of radium employed for ten hours makes a one hundred mg. hour application. The reaction to the skin will guide one in the continuing or withholding of the application of radium. One must be very careful in the use of radium in close vicinity to the eyes, as to possible affection of the cornea. These changes have been experimentally produced on rabbits by Chalupecky.[4]

MESOTHORIUM.

Hahn, who first discovered this substance, finds that it contains about 25 per cent of radium, and has a much shorter lifetime (a few years only). It is a product of thorium. One of the points in favor of mesothorium is the great quantity of soft beta rays which it contains; another important factor is the difference in price, about one-third that of radium. In consequence of these factors, mesothorium is very much in demand in the treatment of inoperable carcinoma.

Thorium X is obtianed in solution and is used as an injection for general treatment of carcinoma, through the circulation as well as locally in the vicinity of the tumor. It is obtained in ampullar form. It loses very rapidly in its action—half its value on the third or fourth day. At times intestinal disturbances follow its administration, but they are only transitory. It is also employed as a drink, in pills, gargles, inhalations, as dusting powder, and salves. The time is too recent to say what the ultimate results will be from its use, but there are already some evidences of good results.

Results from these radioactive substances are about the same as X-ray. Superficial growths are very well influenced, and in locations as the alæ of the nose, etc., where one may surgically remove the growth easily enough with a defect remaining that would require quite a plastic, radium will accomplish its results with very little scar formation. Deep seated growths are less favorably acted upon, yet by applying the crossfire action and following the principles of Gauss and Kroenig in Roentgen ray treatment of deep penetrations and many points of entrance, results similar to those obtained with X-ray were demonstrated. The gamma rays were found responsible for the results obtained in deep seated cancers, the alpha and beta rays being excluded by filters. These authors employ very large quantities (100 to 800 mgr.) of mesothorium and leave it in situ as long as a week. They also combine Roentgen and mesothorium ray treatment, and claim to obtain good results. It is valuable to give a summary of the work of these men (Gauss and Kroenig[5]) in the treatment of cancer by radioactive substances, including X-rays: Forty-six cases of cancer in various organs of the body were treated by radioactive substances without operation. Aside from the rays, injections of thorium were employed. Five of these cases died, seven discontinued treatment, nineteen are still under treatment, fifteen cases can be considered cured, as they do not show any symptoms, and tissue from the position of the previously existing tumor examined microscopically was negative as to the presence of cancer cells. Other sources report good results from the use of these radioactive substances in deep seated cancer by deep penetrations. Bumm[6] reports twelve cases of deep seated cancer cured by this method of treatment. He also believes in a radium, mesothorium and X-ray treatment before operating on a cancer, and also in applying these measures after operation. Notwithstanding the fact that these authors can obtain such good results, it is hoped that, at least at this time, no one will treat an operable case of cancer, except superficial carcinoma about the face, by these radioactive substances, because there must still be great chance of recurrence.

REPORT OF CASES.

Case 1.—Man, forty-three years old; married. Three children living and well. Two brothers living, well. Five sisters living, well. Father, seventy-two years old, living and well. Mother, sixty-nine years old, living and well. Patient has had no illness up to present trouble, except when a child of three years had some sort of hip disease, and could not walk for more than a year. About three years ago patient began to grow hoarse and consulted family physician, who told him that the trouble was due to the strain of shouting at a baseball game, and treated him by inhalations and applications to cords; as many as six treatments a week for almost two years, with little or no improvement. He was then advised to see Dr. Brobst, of Peoria, who thought the throat had been overtreated. Dr. Brobst treated the patient for three months, then said he feared cancer and referred the patient to me.

Upon examination of the larynx I found a unilateral swelling, somewhat subglottic, on the left side, near the anterior commissure. There was no interference in the motion of the cords. General physical examination was negative. Laboratory examinations, in the differential diagnosis of tuberculosis and syphilis, were made and found to be negative. Under local anesthesia by indirect laryngoscopy, I removed several small pieces from the small mass for microscopic examination, and it showed them to be free from any suspicious carcinoma, but proved to be simply inflammatory in character. Several weeks later, in consulting with his attending specialist, we decided that there was an increase in the hoarseness as well as an increase in the growth. It was decided that a laryngotomy should be done, more as a preventive measure against carcinoma development.

On May 26, 1913, under general intratracheal insufflation anesthesia of ether, laryngotomy was performed. We removed an oblong mass the size of a small cherry, from the left side, and with it considerable healthy tissue (method as suggested by Green of Boston). The thyroid cartilage was approximated and the soft tissues were sutured; no tracheotomy was employed.

Patient had considerable reaction and difficulty in breathing for about forty-eight hours, but within ten days completely recovered and primary union took place. Patient returned home for observation by his specialist, and after a week the doctor informed me that the larynx was filling up. Believing it to be granulations, I advised local applications of silver nitrate. Subsequently the histologic examination of the mass removed at the operation showed a suspicious area of carcinoma.

The symptoms were not relieved, in fact the laryngeal obstruction increased; patient came back in a week in great distress for air and a hurried tracheotomy was performed.

Examination revealed that the entire larynx was practically filled out with a reddish granulating mass. His physician and I decided that the best thing to do was to reopen and clean out the interior of the larynx, which was done. The histologic examination of this mass proved it to be a rapidly growing carcinoma, and we therefore advised a laryngectomy. This was mentioned to the patient, but he refused, preferring to be treated by radium.

In July, 5 mgr. of radium element (Curie), (property of Dr. W. A. Simpson), or 11.8 radium bromid 50 per cent, was placed within the laryngofissure against the tumor mass and allowed to remain thirty minutes. This treatment was given triweekly, gradually increasing a few minutes each time, until at the end of two weeks it was employed for one hour, three times a week. This line of treatment was continued for about one month, during which a distinct improvement was noticed. The laryngofissure now began to be quite narrow, so much so that the radium introduction was impossible. It was necessary to reopen it in order to carry out these treatments. At the end of six weeks the introduction of the radium in the fissure had to be abandoned, but it was applied externally, as near the seat of the growth as possible. At the end of two months we noted an involvement of the opposite side of the larynx and considerable swelling of the whole thyroid region. Particles of suspicious carcinoma tissue, with which the radium had been in contact, were removed, and the histologic examination showed changes in the epithelium in form of shriveling and inactivity, but quite a new formation of connective tissue. At no time, however, did the epithelial cells disappear. At the same time no decision was reached, and probably the only course to pursue was laryngectomy, since the radium was not improving the condition, which was probably due to the fact that the quantity was not sufficient to destroy the carcinoma. Patient again refused laryngectomy and preferred to experiment with larger quantities of radium.

On September 30th, 10 mgr. of radium element, or 19.8 radium sulphate 70 per cent was obtained (Pittsburgh Radium Co.) by us, and treatment begun a few days later, employing the 5 mgr. of radium element, or 11.8 radium bromid, mentioned above, together with the 10 mgr. radium element, or 19.8 radium sulphate, by the crossfire system.

The larger amount was placed within the existing laryngofissure, and the smaller amount externally, and allowed to remain in situ for about two hours. This crossfire treatment was given three times a week for the same period of time at each treatment. On the alternating days the larger amount was used alone for the same length of time (two hours), within the laryngofissure. Within ten days marked improvement was noticed, in that the laryngofissure became larger, the swelling subsided, and inspection within the fissure could be easily obtained. Not only did the local condition improve, but his general condition as well, for he gained sixteen pounds in weight within three weeks.

This line of treatment was continued for six weeks, at which time symptoms were noted, namely, evening temperature, 100° to 101° F., a general breakdown with corresponding loss of weight, appetite, and sleep. Treatments were now discontinued in the belief that the trouble was due to some toxemia from the excessive use of the radium. The patient was sent home for ten days, to see what effect rest from treatment would have on this general condition.

Patient returned, stating that his condition was improved; he had no fever when treatments were suspended.

Repeated removal of small pieces of tissue for microscopic examination during these treatments always showed the same changes, namely, that the epithelium did not stain very distinctly, and there was an increase in connective tissue.

About two months after crossfire treatment with radium, we noted a swelling in the right side, in the region of the thyroid cartilage, but positively no evidence of any gland in the region of the neck, or any other metastases in any part of the body.

On December 12th, radium treatment was again given, now being employed in the large dose (19.8), within the larynx as well as externally over the site of the swelling, on alternating days, two hours at each sitting. Apparently there was no improvement following this treatment; in fact, swelling on the right side seemed to be increasing in size.

All this time there was practically no interference with the action of swallowing, and upon examination by way of the oral cavity a general edema about the arytenoids was noted. Making a small incision quite distant from the laryngofissure over this right sided swelling mentioned above, in order to remove a small piece for microscopic examination, I came upon an area the size of a small hazel nut, which felt very soft, and when incised it was found to contain not a particle of fluid or substance, but it was only a dead space. Small pieces of tissue excised from this region were subsequently found by microscopic examination to be carcinomatous. This incision was united; it healed by first intention.

Patient seemed to be gradually getting systemically worse, so far as his general condition was concerned, but daily treatment was continued, always for two hours, for another month. Suddenly the entire integument over the right side of the thyroid region broke down and there appeared a cauliflower mass. On manipulation this mass appeared to be entirely free from surrounding tissues except at the upper portion near the thyroid cartilage, and it seemed as though it could be lifted out. Believing that a great deal of septic absorption from this mass was causing the patient's elevation of temperature, I decided to remove it bluntly, and it came off en masse with practically no bleeding or pain. The temperature remained normal for several days after this procedure. Radium treatment, however, was still continued, and patient showed decided improvement locally as well as generally.

Since January 15th, radium treatment was given three hours at a time, and occasionally it was left within the larynx for a twelve hour stretch. Improvement in the local as well as general condition was very apparent, and the excision of particles of tissue from the suspicious area, made in March, showed microscopically that the carcinoma cells lost their staining ability, especially their nuclei. The connective tissue was found in a peculiar arrangement, in that the fibroid band appeared to be greatly spaced, and there were many areas of round cell infiltration.

March 15th the patient was in excellent physical condition, and the local appearance of the larynx treated by radium was good. A thorough physical examination failed to disclose any metastasis anywhere. The Abderhalden test, as well as the urochrom test (Davis), were strongly positive for carcinoma.

March 20th the patient developed an uncontrollable cough and a very marked cachetic condition. Patient refused nourishment and wished to sleep all the time. A metastatic condition of the lungs was suspected. The radium treatment was discontinued and patient sent home, in expectation of a fatal termination. The local condition of the larynx, however, was looking very favorable.

May 20th. Saw patient in consultation with Dr. Brobst while in his city, and found a remarkable change in the patient, in that he appeared more emaciated, much better color, taking liquid food and more interested in everything about him. Temperature normal, and the right side of the laryngofissure appears healed, smooth and soft. On the opposite side there still appears to be evidence of cancer. It is intended to employ more radium on the patient.

There is a peculiar phenomenon, as mentioned by the patient and his family, and that is, on the approach of a storm, especially when accompanied by lightning, he exhibits some uneasiness so that he cannot remain still or in one position more than two or three seconds, continually moving about until the storm has passed. There is also noted a paralysis of the left big toe. Otherwise no glands or metastases can be determined anywhere.

Case 2.—Mr. B., fifty-three years old, referred to me by Dr. Dorsey and Dr. Seidel, of Wichita, Kansas, for laryngectomy. The patient arrived in a state of such marked dyspnea that it was necessary to perform an immediate tracheotomy. His cancer, though marked, was confined entirely within the larynx, and if laryngectomy had been performed he might have been saved. The hurried tracheotomy under local infiltration anesthesia had such an effect on him that he refused the laryngectomy, and returned home with his tracheotomy tube. Eight months later he returned, wishing to have the radium treatment tried on him. He now had esophageal obstruction so that not even fluids could be swallowed. There was also marked infiltration of the neck from the cancer; in other words, an inoperable carcinoma was present.

We now placed the 10 mgr. radium element as far back into the pharynx and as near the diseased tissue as possible, and the 5.5 mgr. radium element on the outside of the neck for crossfire action. This was allowed to remain for two hours at first. Following the first treatment a tremendous flow of saliva, two and a half pints in twenty-four hours, occurred. This same treatment was repeated daily for about one week, and outpouring of saliva was always greatest right after the treatment. In about two weeks he was unable to swallow anything at all, so that it was necessary to feed him by rectum. In accordance with my advice, a gastrostomy was performed under local anesthesia by Dr. C. Beck, with excellent results. When he recovered from this operation I made a tunnel on the side of the neck right into the greater tumor mass, for the implantation of the radium tube. I placed the 10 mgr. radium element into this tunnel and the 5.5 mgr. radium element on the opposite side for crossfire action. This was allowed to remain at first for two hours at a time, for one week. There was noted an improvement in swallowing as well as a diminution in the size of the tumor. I then decided to leave the radium in this tunnel all night, and there occurred a still greater improvement in swallowing and reduction in size of the tumor. But right here we noted what others have noted from too prolonged application of radium, namely, a rapid decline of the general strength of the patient. We learned from this case the positive effect of the radium on the size of the cancer, and the very deleterious effect of prolonged application of strong doses of radium. The patient's family, fearing that he might die in Chicago, decided to take him home, but up to the present time, six months since, he is still alive, although I understand sinking.

About one month later the patient developed marked brain (mental) symptoms and died from general asthenia.

Case 3.—Mr. W., fifty-two years of age, brought to the hospital with severe bleeding from the mouth, great difficulty in swallowing, and marked swelling on the left side of the neck. Examination revealed laryngoesophageal carcinoma, with involvement of the base of the tongue and left inferior tonsillar region; in other words, an inoperable case. I decided to ligate the common carotid, the tumor on the neck preventing tying the external. While doing this I also excised this secondary tumor mass and preserved it under the strictest aseptic precaution, for the purpose of making of autolytic solution according to the method of Fichera. The bleeding stopped and the patient gained some in strength. The physician and patient both were desirous of trying the radium treatment, and this was done. In this instance we applied it for periods of two and three hours each day, to different points about the tumor, using only 10 mgr. of radium element. As in the second case, the same phenomena were observed as to the excessive flow of saliva, but not as to the rapid disappearance of the tumor; on the contrary, the tumor grew more rapidly, and after about six weeks I was compelled to perform tracheotomy. In due time (sixty days from the time the external secondary carcinoma was removed) the autolytic serum injections were given, but apparently with no success. The neck infiltration became so marked as to cause great edema of the tongue, so that the anterior portion became decubitic on resting on the teeth, and a portion of it sloughed away. In spite of all this, the patient is able to swallow liquids quite freely, and is keeping up his strength fairly well. Routine general examination failed to reveal any metastasis elsewhere in the body. From this case we have learned that the action of the radium has been negative as to the retardation or disappearance of the growth, and also that the use of the autolytic solution was not followed by its supposed result. Very little pain present, as in the other two cases.

Patient died about six weeks since the reading of this paper from general asthenia. There were no metastases to be found.

Case 4.—A man, fifty-six years old, who was referred to me with a diagnosis of tubercular laryngitis which would probably call for a tracheotomy, as he had considerable difficulty in breathing at times.

Upon examination I found that there was involvement of the larynx as well as of the base of the tongue and upper part of the esophagus. His sputum and general physical examination, including radiograph of the chest, show negative findings as to tuberculosis. Wassermann was also negative. By means of suspension laryngoscopy the original findings by indirect method were verified, and small pieces were removed for microscopic examination. These showed unmistakable evidences of a carcinoma. This being an inoperable case, radium treatment was begun. (November 4, 1913.) At first the 10 mgr. radium element was placed into the pharynx, as near the seat of the cancer as possible, and 5 mgr. radium element externally. The patient had so much difficulty in breathing while the radium tube was in his mouth, that that method had to be discontinued. We then placed the 10 mgr. of radium element externally on the right side of the neck, as near the cancer as possible, and the 5 mgr. radium element on the opposite side for crossfire action. The seances lasted for two hours. After one month of such daily treatments we discontinued the 5 mgr. radium element and applied the 10 mgr. of radium element externally on the right side, near the cancer, for three hour sittings. The patient had considerably more difficulty in swallowing than at first, and there was much tenderness and distinct evidence of a skin burn, but there were no evidences of glands or other metastasis distant from the growth. The patient lost about six pounds since he began treatment. The excess of the flow of saliva, as in the other cases, was very marked at first, but gradually it diminished so that the flow became about normal. Examination of the involved area, four months later, showed some edema of the soft palate on the right side and some spreading of the cancer locally. Not being encouraged by the progress, and being very homesick, the patient left for his home, resigned to his fate of succumbing to this disease. After about one week at his home the family discovered him dead, apparently during sleep.

The observations I made in this case were:

1. It was not necessary to perform a tracheotomy, which four months previous appeared almost indispensable.

2. As in the other cases, there was no formation of distant metastasis.

3. There was no pain, as is usually present in these cases. The excessive flow of saliva after each application of radium was present, but later ceased.

CONCLUSIONS.

1. None of these cases of carcinoma of the larynx ran the course that similar cases do without radium treatment.

2. Distinct destructive changes, even microscopically proven, of the cancer were observed.

3. Pain was practically absent.

4. The action of the radium differed in some of the cases, as in two the growths disappeared at least for a time, while in two it did not; in fact, the cancer grew.

5. The effect of the radium on the salivary apparatus was very distinct.

6. General symptoms similar to the cachexia, but still differing in some ways, could be seen whenever the radium was used for any prolonged period.

7. From the positive results obtained by the writer in some of the superficial carcinoma of the nose, mouth and palate, and from the good results of others who treat superficial cancers, it is the belief of the writer that much larger doses of radium element employed in the treatment of carcinoma of the larynx would possibly cure such conditions, especially if employed early.

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XXII.

A SHORT STUDY IN THE ETIOLOGY OF NASAL HYDRORRHEA, WITH CASE REPORTS.*

By Harry Kahn, M. D.,

Chicago.

Hydrorrhea nasalis is one of the dark chapters of rhinology. It is a subject usually dismissed with a few words or a paragraph by the textbook writers. Parker says: "The etiology is very doubtful, but generally occurs in neurotic individuals, and is itself closely allied to paroxysmal rhinorrhea; indeed, it is often difficult to draw a sharp line of distinction between the two complaints." Phillips, in his book, published in 1911, is satisfied with this statement: "The exact nature of this affection is not well known, but probably several conditions, mostly neuroses, are causative factors." Gradle's textbook does not mention this phenomenon. Ballenger makes mention of it in a short chapter. Except Bosworth, who, in 1889, first called attention to this affection, and recorded eighteen cases (of these all but three are, in the light of our present knowledge, sinuses diseases), the English writers make little mention of it. The later German textbooks, notably Chiari and Zarniko, pay more attention to the subject.

Chiari, in his "Die Krankheiten der Nase" (1902), page 37, relates a case that appears to have been a cerebrospinal rhinorrhea and not a pure hydrorrhea nasi, the limits of which we will consider later.

Zarniko[1] goes into the subject more thoroughly than any of the textbook authors.

This question has, up to recent times, been merely a speculative one, and all authors agree that the disease is caused by a nervous disturbance causing, as Grayson says, a lack of balance between the arterial and venous circulations.

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*Read at joint meeting of Chicago Laryngological and Otological Society and Section on Oto-Laryngology of St. Louis Medical Society, at St. Louis, Nov. 29, 1913.

There are two types of this affection that present in part the same symptoms, but whose anatomic pathologic basis is entirely different. These are: (a) The cerebrospinal type, and (b) the nasal type.

In the former there is a definite anatomic loss of continuity in the skull, a hiatus is formed, through which the fluid pours into the nasal cavity. In the latter, pure nasal type, which may vary from the paroxysmal rhinitis to the almost painless, nonirritated variety, with only an abnormal volume of watery discharge from the mucous lining of the nose. Between these extremes lie the vast number of intermediate cases, all of which are due to some change in the mucous membrane.

On the examination of case records and searching the literature, one is struck by the fact that this is a disease of adult life or late youth. According to my experience, there has been a preponderance of females, although St. Clair Thompson thinks that males and females are affected alike.

Birkett[2] enumerates the following predisposing factors, viz.:

1. A neurotic temperament, implying susceptibility.
2. A local morbid condition of the nasal mucous membrane, which may or may not be associated with gross pathologic structures.
3. An irritant acting without or within.

Now, as to the active factors in the case. Following the lead of Bresgen,[3] who struck the first note of our modern conception of the pathology, that this disease is a sympathetic nerve affection, we must first consider the work of Max Buch,[4] who has shown by animal experiment that the sympathetic fibers are not sensitive in health, but if they are rendered hyperemic, or if the animal experimented on is teased or tormented, the fibers become very sensitive. Bidder and Volkmann[5] found that the nerves distributed to the mucous membrane of the nose contain five to twenty times as many more sympathetic fibers as the cerebrospinal, and that the preponderance of nerve fibers is most striking in the branches of the fifth nerve distributed to the nose.

The functions of the sympathetic fibers are vasomotor and secretory.[6] Therefore, reasoning from these premises, one is led to believe that hydrorrhea nasalis is a disturbance of the sympathetic nerve fibers in the nasal mucous membrane, caused by some irritant or by nervous shock similar to a tormented animal, giving rise to a change in the function of the fibers and causing vasodilatation and extravasation of a watery fluid.

I wish now to bring two case histories to your notice, hoping at a future period to bring experimental evidence for your consideration.

Case 1.—G. M., female, aged eighteen years. Born in Roumania, came to America at the age of eight. Until her thirteenth year attended public school, when her father's growing business required help. The father being unable to read or write, the patient was sent to business college. The college work was difficult for her to master, and required study most of the day and well into the night. On completing the course she entered her father's office, and worked from 8 a. m. until about 10 p. m. It was during the early months of her business career, worried by the responsibilities of her position and reduced in strength by her hard college course, that the nasal attacks appeared. They are characterized by sneezing, discharge from the nose, swelling of the nose, redness of the eyes, and lacrimation, together with a severe headache. Occurrence varies from twice a week to once in three months, and they last about twenty-four hours. The attacks occasionally come on following a change in the weather, inhaling dust, or most frequently, some disturbance of mental state, worry, excitement, quarrel, etc.

The attacks are ushered in by sneezing, yawning and a subjective occlusion of the nose. This is followed by a thick yellowish discharge, which later becomes thin and watery. The nose now becomes hyperemic and swollen and smarts. Associated with the nasal phenomena the patient's eyes become red and a profuse lacrimation is observed. During the attacks photophobia becomes severe. Frontal headache is, as before stated, a constant symptom. These symptoms last twelve to twenty-four hours, when they gradually disappear. When the attacks occur at frequent intervals they are not as severe as those that come on after longer periods. During the interval between the attacks an examination of the nose and throat is absolutely negative.

Past History.—Has had pneumonia, diphtheria, scarlet fever, measles twice, mumps, operation for appendicitis at the age of sixteen, and had tonsils removed at seventeen, in the hope that their removal would influence the nasal condition by removing a possible septic focus.

Inquiry as to the likes and dislikes for food, to rule out a metabolic disturbance, shows that her average diet consists of:

Breakfast: Tea with lemon; an orange or grape fruit; one soft-boiled egg, and white bread.

Dinner (Noon): Meat soup; chicken or meat; potatoes; canned fruit; Seltzer water.

Supper: Cheese; herring and bread.

Her temperature, pulse and respirations are normal—98.6° F., 88, and 24.

Blood: Hemoglobin (Sahli), 98 per cent; 5,072,000 reds; 11,800 whites (neutrophils, 70; small mononuclears. 28; large mononuclears, 1; eosinophils, 1).

Blood Pressure: Right, 107; left, 110.

Urine negative, even after 90 grams of glucose. Three specimens examined at two-hour intervals. Glucose given at 6 p. m., and urine examined at 6, 8 and 10 a. m. The same result and same intervals after 90 grams of levulose.

Gastric contents after Ewald test meal—on analysis of 100 cc., which was grayish brown, 0.2 per cent free acid, and 41 per cent acidity, with 0 organic; otherwise negative.

Feces: Acid, dark brown, solid. No mucus or pus. Blood, none microscopically; chemically, trace. Food: Occasional epithelial cell and muscle debris.

Case 2.—C. F., aged twenty-six years, female. The death of the father in May, 1911, caused a change in the mode of life of the family; from ease and comparative luxury, they were thrown upon their own resources, the brunt of it all falling on this girl. Six weeks following this great sorrow, and during a time of great stress, the patient developed what she thought was coryza, but which has continued with a slight intermission since the onset, in 1911. The illness is characterized by a sense of occlusion of the nose and a discharge that is usually thin and watery, but sometimes thick and yellow. On arising in the morning the patient sneezes ten to twelve times, and this phenomenon also occurs when the patient is subjected to excitement. Anosmia is present. The menstrual period is accompanied by increased severity of the symptoms.

Objectively, the turbinates on both sides are pale pink, very much swollen, and more sensitive to the touch than normal. The nose seems filled with a thin mucoid fluid that apparently exudes from all the structures in the cavity. Cocainization and adrenalization reduces the turbinal swelling to nearly normal, leaving no pendulous hypertrophic areas.

Stein's injection of alcohol, cauterization of the tuberculum septi, washing the antra of Highmore gave negative results. Small doses of saturated solution of potassium iodid, as advised by Pierce, also gave no results. Physical and neurologic examinations negative.

The patient sleeps well and is given to outdoor sports. According to her own statement, she says: "I am not of a nervous temperament, not irritable, not easily annoyed, nor given to worrying over little things."

Now, the point of this whole discussion and the cases I have recited are cited in proof of the statement that there is a distinct nervous element in these cases. In the first, the girl was tormented by her work and the realization of her immense responsibility. In the second case the rhinorrhea followed in a short time after the death of a remaining parent, throwing on an erstwhile care-free girl the support and responsibility of a family. One case resulted in a rhinitis vasomotoria, and the second in rhinitis edematosa, both of the same class, but of different variety.

I wish, in conclusion, to assert that instead of saying there may be, to say that there is a nervous element in these cases, and that in all probability this unpleasant disease is caused by a change in the reaction of the sympathetic fibers distributed to the nasal mucous membrane of the nose.

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SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE. SECTION ON OTOLOGY.

Meeting of October 2, 1913.

Paper: Concomitant Association of Otitis With Other Diseases.

By Felix Cohn, M. D.

DISCUSSION.

Dr. Isaac Adler expressed his personal gratitude to Dr. Cohn for his able paper, as it contained a vast mass of important diagnostic and clinical material of the utmost value to all physicians—general practitioners as well as otologists. These various forms of concomitant disease are often encountered and are apt to lead to a wrong diagnosis. In speaking before the otologists he felt something like "Saul among the prophets," but would nevertheless like to say a few words regarding a mild form of otitis which frequently occurs concomitantly with rheumatism, which Dr. Cohn had not spoken of. It is a rather harmless form—though some specialists might object to that term—and usually precedes general rheumatic affections. It is accompanied by a serous exudate in the middle ear, which sooner or later becomes absorbed. There is often a peculiar sensitiveness about the mastoid, sometimes associated with swelling, and he knew of a number of cases in which this rheumatic otitis had been treated as suppurative mastoiditis and operated upon, not to the advantage of the patient. It is well worth while to study this form. It usually occurs before the general rheumatism appears, but also after the polyarthritis or the muscular rheumatism has set in, and it gradually disappears. A number of cases had come under his observation, in which the rheumatism appeared first and the otitis later on, had remained for quite a long time, the mastoid and its surroundings being somewhat swollen and tender to the touch for months after the rheumatic conditions had passed away. These conditions might be termed rheumatic osteitis. That they are based upon rheumatism is clear. As a rule they are not serious or dangerous, and get well of themselves. Antirheumatic medication does some good.

Dr. Wm. Sohier Bryant said that the concomitance of otitis with other diseases is so usual that it may, in a way, be compared with the concomitance of fire and smoke. Fire and smoke rarely occur separately; no more do otitis and other diseases. This general concomitance of otitis with other diseases is due to the physiologic location of the ear and to its anatomic connections.

Physiologically, the ear is situated at the opening of the respiratory tract and at the upper end of the digestive tract, with both of which it is connected by the pharyngeal tube. Therefore, whatever inflammatory disease affects the digestive or respiratory tracts must, of necessity, cause corresponding changes in the ear. Pharyngitis or pneumonia, tonsillitis or typhoid fever, have their bearing on the ear and betray themselves by a catarrhal otitis media, a purulent otitis media, otitis interna, or an auditory neuritis. The truth of the reverse of this observation—that the otitis causes diseases of the respiratory and degistive tracts—is exemplified in the fact that often pharyngitis, bronchopneumonia, gastric and duodenal ulcer, or appendicitis follow purulent otitis media.

Anatomically, the ear is located between the nasopharyngeal and the cranial cavities, and is connected with both. By extension, diseases of these regions easily reach the ear. There are three ways in which this occurs: (1) By direct extension and aspiration; (2) by the blood vessels and lymph channels; (3) by the nerves.

1. Diseases of organs situated near the ear cause otitis by direct extension or aspiration. For example, adenitis of lymphatic and salivary glands, erysipelatous dermatitis of the face, sinusitis of the nose, pharyngitis, tonsillitis, and many more diseases, cause otitis by direct extension of inflammation to the ear.

2. The blood vessels and lymphatics of the ear carry bacteria and toxic substances from diseased organs to the ear, causing otitis. Observe otitis with the exanthemata, pharyn-

gitis, tonsillitis, hypothyroidism, syphilis, epidemic parotiditis, and nasal sinusitis.

3. Otitis may occur through diseases of the auditory and facial nerves, and through diseases of the tympanic plexus of nerves which connects the ear with the cranium, autonomic and sympathetic nerves comprising the geniculate, Gasserian, ciliary, sphenopalatine, otic, petrous, and submaxillary ganglia, and the ganglion of the root, together with the third, fourth, fifth, seventh, eighth, ninth and tenth cranial nerves, and the second and third cervical nerves. Note—herpes zoster and trophic disturbance of the ear.

All general pathologic states and diseases can produce inflammatory changes in the ear. The reverse is equally true and obvious—otitis causes other diseases: (1) By direct extension through the neck and throat; and by aspiration, otitis produces meningitis, brain abscess, venous thrombosis, pharyngeal abscess, cervical cellulitis, mediastinal cellulitis, lymphadenitis, erysipelas, pharyngitis, gastric and duodenal ulcer, appendicitis, and bronchopneumonia. (2) Through the blood and lymphatic vessels otitis produces disease by thrombosis and emboli to the brain and system generally. Otitis also produces pneumonia, pleurisy, sinusitis, metastatic abscesses, nephritis, bacteremia, and toxemia, and many other diseases and conditions. (3) Otitis causes nerve reflex disturbances, cough, epilepsy, neurasthenia, myasthenia, defective equilibration, psychoses, and psychesthenias.

Otitis affects the general system through toxic products and metastases, causing inflammations. It also affects the general system through nervous exhaustion, causing psychopathies and neuroses: and neurasthenias of the autonomic and sympathetic nervous systems, which in their turn produce abnormal secretions of the ductless glands—thyroid, pancreas, pituitary, suprarenal, and others.

Keep your eye on the ear in diseases of other organs and your eye on the other organs in diseases of the ear. The specialist on the ear should be keen to discover any defect in other organs and have their defects corrected for the benefit of the ear; also specialists on diseases of other organs than the ear should be keen to discover any malign effects of these other diseases upon the ear, and should be prompt in mitigating the damage to the ear.

Dr. Felix Cohn thanked the gentlemen for their participation in the discussion. He could only endorse Dr. Adler's remarks in regard to the relation of otitis to rheumatic conditions. The otitis occurring with rheumatic affections also belongs to the protopathic type, and there are cases on record in which, as in some other infectious diseases, the early manifestation had preceded the rheumatic attack by several days. These forms of early otitis occur with almost all infectious diseases.

In regard to the remarks of Dr. Bryant, while he agreed entirely with Dr. Bryant's views, the subject of the paper was not the various conditions under which we may have a middle ear inflammation, but on the concomitant association of otitis with other diseases. The otitis referred to by Dr. Bryant is really the socalled genuine otitis, in which doubtless the infection is caused by contiguity. In the cases of concomitant otitis, we can almost practically exclude this causation. This subject is of especial interest because we are now even able to occasionally separate the secondary forms of otitis from the cases of concomitant otitis, even if the otitis is produced by similar organisms. The agglutinative action of the pneumococcus obtained from the middle ear on the serum of the patient in cases of pneumococcus otitis due to a general pneumococcus infection, as opposed to the absence of agglutination in secondary genuine forms of pneumococcus otitis, is sufficient proof that these forms of otitis, though apparently induced by the same organism, cannot be considered identical.

With reference to the inquiry of Dr. Polk in regard to the association of otitis with typhoid, we find similar conditions as in other infectious diseases. In the protopathic forms of otitis we find the exudate usually either sterile or containing the specific organisms in those infectious in which specific organisms are present. In typhoid we therefore find either a sterile exudate or the typhoid bacillus, and there are cases on record where a pure culture has been found even in the fourth week of the typhoid. While the exudate may be sterile at first, we, of course, very soon find other organisms present, which invade the middle ear either by contiguity through the tube or from the external ear.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of November 14, 1913.

Paper: Contre-Coup Fracture of Skull.*

By Talbot R. Chambers, M. D.

Probable Injury to Jugular Bulb Following Myringotomy in Infant Ten Months of Age.†

By John Randolph Page, M. D.

DISCUSSION.

Dr. Duel said that the point made by Dr. Page in regard to the possibility of injury to the bulb by myringotomy was very well taken, and recalled an instance which had occurred the year before in which the bulb was undoubtedly injured during a myringotomy performed by a pediatrist who does this operation very frequently. There was no subsequent infection of the bulb, however, although a packing was required for some days in order to control the hemorrhage.

Dr. Jarecky told of a case admitted to the Sydenham Hospital three years ago on account of profuse hemorrhage from the ear. This patient had an otitis media, for which the family physician had incised the tympanic membrane. The temperature was not high when admitted, about 102° ; that soon subsided somewhat, but the bleeding continued. An injection of horse serum, 20 cc., was given, the temperature dropped to normal, the hemorrhage ceased, and the membrane became normal in a short time. Undoubtedly the jugular bulb had been incised.

Dr. Seymour Oppenheimer said that the knowledge that a myringotomy is not such a simple thing ought to be more generally disseminated. It was quite certain that if we could get reports from all the men who are doing myringotomies we would learn that many accidents are occurring, resulting in subsequent impairment of the hearing function. He has seen three cases in which there was an ossicular dislocation on account of an improperly placed incision in the drum membrane. The pediatrists are the chief offenders in this respect, and if the facts in regard to this subject were more generally disseminated among them, much would be accomplished toward the elevation of the science of otology, and myringotomy would not be regarded as a simple stab.

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*See page 164. †See page 161.

Paper: The Epipharynx in Childhood in Its Otologic Aspect.*

By Edgar M. Holmes, M. D.

(BY INVITATION.)

DISCUSSION.

Dr. Myles expressed the thanks of the section to Dr. Holmes for his valuable rounding up of the subject. Most surgeons are pleased with the gross results obtained in this field of work, but very few of those who follow up the operative procedure are satisfied with the net results. For some time past he himself has made diagrammatic sketches of this region, measuring through the oropharynx and through the nose. He had noted considerable adhesive tissue in Rosenmüller's fossæ after operations by those who used large curettes, probably from the taking out of too much of the mucosa and not limiting the operation to the adenoid tissue per se. The more nearly the operation is confined to the adenoid tissue and the less the mucosa is injured, the better the result. So far his best results in cleaning out these fossæ have been obtained with the index finger.

The technic developed by Dr. Holmes and the masterly way in which he manipulates the instruments, and the almost superhuman way he has of preventing tuborhinopharyngeal adhesions from developing are remarkable. The important point, however, is to ascertain how much the overcuretting or overremoval of the mucosa of the deeper parts lying around the rhinopharynx or epipharynx is attended by evil results. It is in this way that the technic should be improved; in other words, only so much of the tissue as is absolutely necessary should be removed, and no more.

Dr. Yankauer said that he was much pleased to hear Dr. Holmes strike the conservative note in regard to adenoids.

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*See page 138.

Within the last six months he himself had had occasion to refuse operation to at least four cases in private practice, and of course the number of cases that are constantly referred to the clinics from the schools, in which operation is refused, is very much greater. The manner of dealing with this question in New York is perhaps slightly different from that pursued in Boston. The children sent to the clinics in New York are not sent for operation, but for diagnosis and appropriate treatment.

Dr. Yankauer said that he was thoroughly in accord with Dr. Holmes' remarks in regard to the importance of examining the rhinopharynx some time after operation in order to note the end results. In the examinations which he himself has made—some with Dr. Holmes' speculum and some with the direct speculum—he has occasionally found it necessary to sever an adhesion, and this has been easier to do with the direct speculum than with Dr. Holmes' instrument. In children two or three years of age and older it is possible to use the same direct speculum as in adenoids. It is Dr. Yankauer's custom, after the operation, to introduce the speculum, and by keeping the field clear with the suction apparatus, there is very little difficulty in determining the thoroughness and efficiency of the operation, and removing any shreds of tissue that may remain in the nasopharynx. In very young children or in infants, however, the instrument has proved too large.

He has had occasion to inspect the nasopharynx of such children as have been troubled with continuing ear symptoms, and has used various sizes of the direct speculum, and has found that one of the smaller sizes was the most useful in young infants. It has an opening of about one-quarter that of an adult speculum.

The removal of the adhesions between the eustachian tube and the posterior pharyngeal wall is of very great significance, and does not seem to be generally recognized. This importance consists not only in limiting the movement of the tube—the interior wall takes more part in the motion than the posterior wall—but in the interference of these adhesions with the drainage. If one will only think it over, he can readily see that there was a reason for the eustachian tube being built just as it is—because the nose is filled with infectious germs in most persons, and the tube forms a wall around the hole which leads to the ear and prevents the secretion from the nose getting into the ear. When the patients lie down, the secretions flow above the eustachian tube, into the fossa of Rosenmüller and down into the pharynx. The function of the eustachian cushion is to prevent the secretions of the nose, which are necessarily infectious, as the nose is the filter which filters the germs from the air, from getting into the ear. If the adhesions are there, the gutter is blocked up, and the secretion flows over the cushion and gets into the tube.

Dr. Yankauer said that he had formerly used the old method of removing these adhesions, namely, breaking them down with the finger; but that as he had had them recur and had to break them down again, he had found that by punching them out they are less liable to return. This punching out is followed by applications of nitrate of silver until the wound is healed. It is very easy to get behind the cushion and lift it forward, and by inspection treat the granulations that form and so prevent the recurrence of adhesions.

Dr. Holmes had mentioned a method of treating the early stage of acute otitis in children. Dr. Yankauer said that he had been especially interested in this, for he had been doing the same thing for a long time. Two or three years ago he had published a paper on the eustachian tube, in which he had mentioned the use of cocain and adrenalin followed by argyrol in the acute stages, and had also said that it was sometimes possible to abort acute otitis media. His subsequent experience, however, had shown that when there is already pus in the middle ear, even if the pain can be relieved by cocainizing the tube, the suppuration will continue, and sometimes two or three days later there will be a spontaneous rupture. In the very early stages of otitis, however, before suppuration is established in the middle ear, it is possible to abort an otitis by cocain and adrenalin. He had not tried to do this with young children with the direct speculum, but had found it just as practicable to put the child flat on its back, with the head turned to the diseased side, and then drop the cocain and adrenalin into the nose, being careful that it reaches the floor of the nose, preferably under the turbinate; for this reason he uses a curved dropper. Very often within a few minutes the pain is relieved and the child goes to sleep. Dr.

Yankauer said that the section was indebted to Dr. Holmes for presenting this subject in such a vivid and interesting manner.

Dr. Duel said that Dr. Myles had "hit the nail on the head" when he said that the gross results in this field of work were satisfactory, but that the net results were very unsatisfactory. There is no question that in the majority of the patients who present themselves at the clinics and in private offices it should be determined with great ease whether or not they have a condition demanding operation, without a very rigid examination—the history of the child, the question of breathing, etc., the usual history that comes with such cases, is sufficient to save any experienced surgeon from the chagrin of being put down by future generations as having been either too radical or too careless. He was convinced, however, that a small minority require more care and judgment in regard to whether or not they should be operated, and should frequently be kept under prophylactic measures for a longer period before it was.

As he observes operators nowadays, it seems to him that less rough methods are being employed than formerly. The curette is used less than formerly, and most operators are using some form of instrument by which the danger of stripping the mucous membrane down the posterior wall of the pharynx is lessened, and when the curette is used it is employed to remove only a small portion of tissue just in the region of the vomer.

One of the important points to which Dr. Holmes had directed attention was the question of moisture in the atmosphere for children suffering with nasopharyngeal obstruction. There is no doubt that many questionable cases would clear up if the proper hygiene of the nasopharynx were maintained and the children were kept in the open air or in properly moistened atmosphere. If we should examine the hygroscopic condition in most of the rooms in New York it would be found that it is altogether too low, and every one would be more comfortable if there were more moisture in the air.

A very interesting experiment has been carried on at the Babies' Hospital, which has considerable significance in regard to the infection of the middle ear by the route of the nasopharynx. At Dr. Holt's suggestion, Dr. Duel and Dr.

Chappell had discussed the possibility of cutting down the number of cases developing middle ear conditions after having been admitted with catarrhal conditions of the nose. It was suggested that half of a ward of patients suffering under similar conditions be subjected to a certain hygiene of the nasopharynx, while the other half were let alone. It was significant that of the large number of patients under observation, in the course of a year 50 per cent less of those who were subjected to the rigid routine of clearing out the nasopharynx developed middle ear conditions, as compared with those with whom nothing had been done.

We cannot lay too much stress on the importance of prophylactic measures in cases of simple catarrhal conditions, or in cases where there is pharyngeal obstruction. Dr. Duel said that personally he had questioned the value of the method proposed, and was very glad to record himself now as having gone through with the experiment and as having been wrong. The method proposed was the use of the postnasal douche, containing a 25 per cent argyrol solution. His contention had been that the employment of the postnasal douche might result in forcing infection into the ear, and that this danger might be avoided by simply dropping the solution into the nose; but Dr. Chappell contended that by employing the method which he has always used successfully (by pulling the soft palate forward with the curve of the instrument before the fluid was shot out), he found that there was absolutely no danger. Dr. Duel said that he had contended that while Dr. Chappell himself might do this successfully, it would not be properly done in the routine of the hospital. Then Dr. Chappell agreed to instruct the house surgeons in the method, and they soon became expert and did it very well, with the favorable results reported.

Dr. William C. Braislin said that some years ago he had had an opportunity of examining the nasopharynx of fifteen newborn children (still born), and in all, with one exception, there was a well marked pad of lymphoid tissue which with an instrument could have been attacked and a good deal removed. In the one case in which this was absent, the child was obviously diseased, and would not have survived in any event. It had greatly surprised him to find this condition; but to have made this series of examinations and to have found such a considerable mass of adenoids present at birth proved to him a need of this tissue and that it has a physiologic function. Personally he believes that its function is to moisten and warm the air; of which physiologic function these young children get so little from the nose, which is so small. Its width is small, and anteroposteriorly it is also small, as are also all the bones which make up the nose and face; while, on the other hand, the infantile pharynx is comparatively of greater superficial extent than in the adult.

The matter of using the douche, of which Dr. Duel has spoken, is interesting. The use of the douche, particularly in children, and even more especially in very young children, seems to him rather harmless, however used—that is, when a nonirritating fluid is employed. The doctor said he felt quite free to recommend douches in the many cases in which he thought it needful, with the proviso that for a few minutes subsequently the nose should not be blown at all, and that an interval of time, sufficient for the fluid to drain away from the mouth of the tube, should elapse before an attempt is made to blow the fluid from the nose.

Dr. Jarecky said that the subject is full of interest. The school inspectors send patients to the clinics requiring adenoid operations simply because the children are mouth breathers. They do not recognize whether the children have adenoids, but they are mouth breathers; and so with the general practitioners—when they came across a mouth breather, they require an adenoid operation; they do not stop to consider whether or not the children have had syphilis, or suffer from some bony obstruction in the nasopharynx, etc., but they want the children operated, and when that is attempted, the results are unsuccessful in relieving the child. That must be, for the condition does not demand it.

He had used the instrument which Dr. Holmes recommended. Recently he had seen a boy fourteen years old who came from Pennsylvania troubled with defective hearing. His adenoids had been removed, but the hearing was not improved. In this case the adhesions present around the eustachian tube were so easily relieved by the use of Dr. Holmes' instrument that the patient was quite delighted with the resulting increase in hearing. He had been using argyrol for fully three years in these cases of nasal obstruction and congestion of the soft tissue, with good results. Not only in the nose and throat cases, but also where some inflamed condition with discharge from the nose and irritation of the eyes is present. If it is used in the eyes and the lacrimal duct is patent, it will go down to the nose and the result is very satisfactory.

Dr. Cocks said that one point had not been spoken of. If all the operators would use a general anesthetic, especially with children, there would not be so many cases of injury to the nasopharynx, soft palate and other structures in the throat. There are still many clinics in the city where adenoid and tonsil operations are being done without any anesthetic at all. This is not only cruel, but is also unscientific, and the surgeon who operates in that way takes many undue risks. The time has come to demand a halt in such procedures.

Dr. Heller said that Dr. Holmes had not referred to the shape of the vault. As every one knows, the vault is formed by the under surface of the body of the sphenoid and by the anterior surface of the atlas and axis. He had been surprised to observe that often where the obstruction seemed the greatest there was often very little adenoid tissue; and in other cases, where the children did not complain of mouth breathing, there was quite a little. Then he discovered the difference lay in the shape of the vault, and tried by digital examination to determine beforehand what that shape was in each case. He had not been very successful, as these cases of adenoids occur in very little children, and if there is any adenoid tissue the vault is pretty well filled up. Then we do not always use the right curette. The shape of the curette has a great deal to do with the success of the operation. If there is a big hollowed-out vault and we use a shallow curved curette, we do not get far enough back, and do not get it all out. In other cases we get out too much. If there is a shallow vault, there is opportunity for more adhesions; or perhaps a little granulation tissue takes up this narrow space, and the child comes in some time later with the return of mouth breathing. The doctor said that he was trying to examine these little patients after operation carefully, although it was not always easy; the mothers sometimes object, and the children always do. It seemed certain that the shape of the vault had a great deal to do with the results obtained.

Another important point is that of medication in the nose. Every running nose ought to be treated, and physicians and parents should understand that such a condition is very far from normal, with or without otitis media. In such cases he has been using menthol one-half per cent and iodin one-fourth per cent in albolene. It irritates the nose and makes the children sneeze, and they sneeze out a great deal of the mucus which otherwise would stay in the nose. Such a remedy should be put into the nose two or three times a day, in the Rose position. The children object, and the parents think it very cruel, but the results justified him in the belief that it is very beneficial.

Dr. Lederman said that one or two facts struck him as being very pertinent, especially what Dr. Braislin had said about the conditions in newborn children. We have gone ahead without giving the subject of physiology proper attention, and if Dr. Braislin was able to observe that mass of glandular tissue in the newborn, it certainly had a meaning. We are probably operating too early on these cases; it is important that they should be carefully observed and treated before operating. We all know of cases in which masses of adenoids have been removed, and have recurred. That does not happen because it was removed, but for some physiologic reason, and this question should receive more attention. There are a number of children of this type for whom hygienic treatment will do much, and they will probably be more benefited by local treatment than by going on to operation, which may leave the rhinopharynx dry, and lead to injury of the organ of hearing.

Another point is the operation on these children in a state of acute infection. We know that there are some of our confreres who will operate during an acute tonsillitis or acute otitis, and take out tonsils and adenoid tissue, and perhaps expose the children to serious consequences.

A third point is the treatment of this condition (acute otitis) locally, and also the rhinopharynx as part of the ailment. A good many years ago he had adopted the argyrol treatment of the nose and rhinopharynx, and many of these cases are much benefited and are cured in quicker time by these topical applications if made by the physician, and not by the patients, who cannot do it properly.

Dr. Wilson said that the section was much indebted to Dr. Holmes for coming over from Boston and stirring them up on this subject. Two or three years ago he had himself read a paper, before the laryngological section, on the removal of tonsils and adenoids, in which he had claimed that we were operating on too many of these cases. He had asked some friends in New York why they were doing so much operating, and they informed him that it was because the school inspector had sent the children to the clinics and would not allow them to return to school until some operation had been done. We are all aware of the fact that young children have adenoids. Every child has adenoids, and because it has a ring of lymphoid tissue in the epipharynx is no reason for its removal. If this tissue becomes very large, it may become necessary to remove it, but it is certain that many of these cases can be reduced by hygienic means and local treatment, without resorting to operation.

Dr. Seymour Oppenheimer said that he had recently read of two deaths following the introduction of menthol into the nose of young children, and this should be borne in mind, as it might be attended with very disastrous consequences. He had recently had the pleasure of seeing some of Dr. Holmes' work in Boston, and had been delighted with the great skill which the doctor showed in treating the nasopharynx, eustachian tubes and accessory nasal cavities under the guidance of the pharyngoscope. One could not realize, until he made a trial himself, how much skill and patience Dr. Holmes had exercised to bring himself up to the stage of proficiency which he had attained.

Dr. Holmes, in closing the discussion, expressed himself as highly gratified at the manner in which the members of the section had elaborated upon his paper, they having brought out many points which he could not well treat of in a paper of limited extent. He was going home very happy, for while he knew that he would be treated as a gentleman, he feared that he would meet with a rather warm reception for being so conservative. He realized that too much care is not necessarily conservatism; but while he did not fear that we would be too conservative, he believed that in the future we would be more careful than we have been in the past in regard to the removal of growths in the epipharynx, especially bands in the lateral fossa. Every one works up a certain technic and becomes proficient in it, and for a number of years he had removed the bands with his finger, but he had more adhesions recur in that class of cases than since he has adopted the plan of removing them with a sharp curette or forceps under the guidance of vision. In using these instruments, however, one must observe great care not to cut over toward the cushion of the tube.

With regard to the epipharynx in children, he had not tried to take up the anatomy in this paper. Of course that has been studied in very young children. They all have quite an amount of adenoid growth, but they have not a large sphenoid prominence. They can have quite a large amount without affecting the eustachian tube. It is perhaps greater than in more advanced life. In development the face grows downward, and the upper part does not change so much. The upper wall is narrower and lower than the floor of the epipharynx or the roof of the soft palate.

Dr. Holmes expressed his gratitude to Dr. Duel for bringing out the question of the douche. He felt that perhaps he had been too careful, and possibly the bad results that he had seen were due to faulty technic in using the douche, so that he had become overalarmed in regard to it. It was, therefore, possible that the statement he had made in this respect was incorrect.

He had not touched upon the subject of the chronic disease of the tube, for, as a rule, that had reference to much older people. In young children the tube, unless there is some congenital deformity or acute severe infection, will usually take care of itself, after the nose and the epipharynx have been cared for. In the manner of the treatment of the tube, he had not changed very much from the technic and methods which he had published during the last two years. In those cases where there are obstructions in the tube that do not subside after the epipharyngeal end has been cared for, the slow bougieing with the cotton tipped bougie has given better results than those obtained in any other way. One must be careful in the force used; if the dilatation is done rapidly, it will almost always result in failure. If the eustachian tube is treated by careful and progressive bougieing, as is the urethra, we will be gratified with the results.

In regard to Dr. Yankauer's cases of purulent secretion within the ear, Dr. Holmes said he would agree that in all cases where there is mastoid extension with secretion, if the bulging is not reduced and there is still a tense bulging after the pain is relieved, he would not say "do not perform a myringotomy," for there will likely follow rupture of the membrane; yet during his last service in the dispensary treatment of the tubes was carried out upon all of the acute cases and in a number of them where there was pus, the bulging almost always subsided after a short time. Out of some fifty-odd cases, there were only two in which a paracentesis was performed. How many of them were purulent he could not say, for he had not treated all of them personally. The main thing seems to be not to forget that one function of the eustachian tube, which is possibly as important as that of ventilating the ear, is to act as a drain of that cavity. The aural mucous membrane, as do other mucous membranes, secretes more or less. It is probable that a small amount of this secretion is reabsorbed; as a rule, the excretions from the mucous membranes are almost always carried off. The eustachian tube is the natural outlet from the middle ear; it is anatomically supplied with cilia. While one function is to drain a deep seated cavity, any infection, whether purulent or not, that is sufficient to close the eustachian tube, is sufficient to disturb the processes of nature. If the eustachian tube is closed, the drainage is cut off, and there is no method of relieving the pressure in the ear, and the bulging of the drum membrane results. The minute that takes place and the secretion continues, there is pressure on all of the veins and capillaries, and more blood is carried into this inflamed area. This is nature's way in caring for an acute inflammation, and in almost every other place it is successful; but here we have a cavity nearly enclosed by a bony wall, the only yielding portion being the membrane and the eustachian tube. If we can relieve the tube and reestablish drainage, we give nature a chance to combat the disease. The pressure is reduced, the bulging of the membrane subsides, and the symptoms are relieved. We can drain the tube and restore the normal pressure of the middle ear, temporarily at least, in a large percentage of the cases of middle ear inflammation.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY AND SECTION ON OTOLARYNGOLOGY, ST. LOUIS MEDICAL SOCIETY.

JOINT SESSION, NOVEMBER 29, 1914.

Paper: The Semicircular Canals and the Function of Equilibrium.*

BY GEORGE E. SHAMBAUGH, M. D.

DISCUSSION.

DR. J. GORDON WILSON: There have been from time to time several explanations of the modus operandi of the influence which the internal ear exercises on muscle movement, and which Ewald called labyrinthine tonus. Ewald's idea was that the hairs of the maculæ and cristæ are always active and keep the endolymph in movement; further, that a movement of the endolymph produced by some other power which would increase or retard the activity of these cilia, would influence muscle tonus. This hypothesis, as Dr. Shambaugh has said, offers very serious objections. The hypothesis which Dr. Shambaugh advances, he has so briefly stated that one must have more details before coming to any definite opinion.

It is well known that the labyrinth is only one variety of organ which regulates muscle tonus. It constitutes a specially modified variety which presides over the head segment. We note then that Dr. Shambaugh's hypothesis is applicable to this special and very important type, and is not generally applicable to tonus organs. We are all agreed that the stimulation of the endings of the vestibular nerve probably comes through the hair cells. We are also agreed that currents of endolymph in canals of such minute size are inconceivable, and that we have probably to do with mass movements. This was Crum Brown's and Mach's original idea, and now is universally accepted.

Two obvious objections present themselves to Dr. Shambaugh's hypothesis. First, so far we have no anatomic proof

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*See page 111.

that the hairs differ in the two sides of this crista in any way whatever. Further, would we not have to reverse the hypothetic strain in the various canals to bring it into line with the physiologic phenomena, since the maximum current in the horizontal differs in direction from maximum currents in the superior. Again, the explanation offered can only apply to animals with a canalicular system, and cannot be universally true of organs of equilibrium situated in the head segment. Thus, the squid has a well organized equilibrium organ called the labyrinth in the head segment, with three crista which lie in the three dimensions of space, but within one sac. Here it is obvious Dr. Shambaugh's hypothesis is not adequate to explain the phenomena of tonus movement.

Dr. Shambaugh desires to bring cerebellar tonus into direct association with labyrinthine tonus. I am not quite clear how dependent on each other he would make them. To my mind, cerebellar tonus is essentially different. In the cerebellum we have the grouping of the lines of communication from the peripheral tonus organs; a lesion of the cerebellum disturbs the lines of communication. In the labyrinth we have a peripheral tonus organ. As Dr. Shambaugh has pointed out, labyrinth action is well marked on the eye muscles. Here certainly the labyrinth reaction is distinct and independent of cerebellar influence. It is true, both influence the eyes and produce movements; but these are not alike, and, as I have shown elsewhere, are independent of each other.

There are a number of gaps in the description which, had Dr. Shambaugh time, without doubt, he would have filled. To discuss the subject fully, one would require the full text to see how these gaps are to be filled in. There is at present no hypothesis which commands general approval, and the full text of Dr. Shambaugh's paper will be awaited with interest.

Dr. D. S. Booth: I would like to ask the question—i. e., is this a recognized fact among the otolaryngologists?—because I think the neurologist's explanation is that tonus is maintained by the cerebellum. I think that is the teaching of all the works on nervous diseases I have read, and this one is a new explanation to me, and I would like to know if it is definitely known and generally accepted.

Dr. Shambaugh, in closing: There are a great many questions in connection with labyrinth tonus that have not been touched upon in the discussion presented this evening. It is important that one should have a satisfactory hypothesis to explain the clinical phenomena resulting from a disturbance of labyrinth tonus. It is not at all satisfactory to attempt to apply the rule of thumb in connection with these symptoms. A great variety of pathologic conditions, both in the labyrinth and intracranially, may arise and disturb the normal tonus. A very important factor in preserving equilibrium is the extralabyrinth tonus which arises from afferent impulses other than those from the labyrinth. This I have not touched upon at all in my paper.

The question has been asked whether otologists are agreed that disturbances of equilibrium are dependent upon pathologic conditions in the labyrinth. The interrogator seems to be under the impression that the accepted idea is that the cerebellum presides over this function. In reply I would state simply that I do not believe there is any difference of opinion, either among otologists or physiologists, regarding the important role taken by the vestibular apparatus in preserving the equilibrium of the body. Of course, any intracranial disturbance of the tract of the vestibular nerve produces the same sort of disturbance of equilibrium as that which arises from alteration in the end organ of the labyrinth.

Paper: Syphilis of the Ear.*

By Otto J. Stein, M. D.

DISCUSSION.

Dr. Beck: There is one point in particular in this paper that I would like to emphasize, and that is the condition of syphilis in the tube. One cannot too strongly keep that in mind in conditions of deep ulcers of the pharynx which occur in the later stages of syphilis. One should not allow the tube to close during the healing process, and the practical method to prevent obliteration is to pass graduated eustachian bougies. I have had such cases to deal with, and I believe that by this method of bougie dilatation complete obliteration of the tube was prevented.

Another point of interest to me was the pathology of the mastoid. I have had several cases in point. One in particular comes to my mind at present. A young woman, who had had four mastoid operations, came to me and I operated, but the suppuration still continued. I had saved several bone chips from the operated mastoid, and a microscopic examination revealed the characteristics of syphilitic ostitis, such as are found anywhere in the body in syphilitic bone disease, except as modified by the anatomic characteristics of the mastoid. The patient recovered after having been treated by antiluetic measures.

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*See page 116.

The point to which I thought the doctor intended to limit his paper is the use of salvarsan and the deafness following its employment. It is well understood, as the doctor brought out, that there is a swelling around the nerves following the injection, due to a liberation of syphilotoxins, which bring about a temporary edema known as Herxheimer's reaction. We also know that other drugs, mercury, for instance, will do the same thing, though not as frequently. There results a pressure within the long canals, and facial paralysis, deafness and blindness may ensue. This means that more salvarsan is indicated, also more mercury, large doses of potassium iodid, and elimination by means of pilocarpin, in order to bring about the desired effect. I think this paper of Dr. Stein's is one of the best contributions we have ever had on this subject.

Dr. Harry Kahn: Just a word in regard to deafness from salvarsan. I know of one case in which a onesided deafness resulted from one dose of salvarsan, which did not disappear after a second dose, mercurial and eliminative treatment. The patient was still deaf at the end of six months. A one-sided deafness means there is at least something in this action on some part of the ear.

Dr. Louis K. Guggenheim: There is usually doubt in cases of auditory nerve involvement, following the injection of salvarsan, as to whether the condition is luetic or a result of the selective action of the arsenic preparation, and as far as I know there is no single case reported where there is absolute certainty as to this. I recently examined a patient in whose case there was no doubt as to the absence of lues. Enormous doses of salvarsan were given—three injections within one month. Several weeks following the last injection there occurred vertigo, disturbance of equilibrium and deafness (right ear), all within eight hours after the aural complication was first noticed. The Wassermann test was negative, and arsenic was found in the urine five months after the first injection.

Dr. Robert Sonnenschein: I simply wish to call attention to the fact that Neumann, among others, states that those cases of obstinate otitis externa diffusa in which no bacillus pyocyaneus or other distinct infectious agent can be found, should be viewed as possibly of luetic origin. In some of these cases no treatment other than an antiluetic one is of any avail.

Dr. J. Gordon Wilson: It may be of interest to refer to some experiments carried on to determine the action of organic arsenic compounds on the acoustic and optic nerves. As you know, salvarsan belongs to this organic arsenic group. I think it is established that such organic arsenic compounds can have a definite action on the second and eighth nerves of some animals, causing vestibular irritation and blindness. These experiments have been conducted on animals which have a very easily irritated vestibular mechanism. The important point established so far is that only such animals show the labyrinth reaction to these drugs as have this susceptible mechanism. It remains to be seen whether we can by injuring or depressing the activity of the eighth nerve in nonsusceptible animals produce similar labyrinthine phenomena. The pathologic changes I have observed are distinct. They consist in leucocyte exudation and rapid formation of plasma cells along the course of the eighth nerve, with changes in the vestibular nuclei.

Dr. H. W. Loeb: I would like to refer to a case reported by me some time ago. A young man was found to have a chancre; the chancre was excised and spirochetes found present. He was given a dose of salvarsan on the next day. Three weeks later, not having any further treatment nor any other symptoms, he became attacked with nausea and nystagmus towards the opposite side, and deafness in the right ear. The nystagmus continued for some time; the deafness has never been overcome. There was never present a single syphilitic lesion except the chancre. He had no further treatment, that is, up to the time he left my observation. I only saw him with reference to his ear, but it seems to me that the effect could hardly be ascribed to anything but to the salvarsan.

since it meets with the findings of other case reports on the subject.

Dr. E. L. Opie: I feel that I have very little to add to this discussion. I am always impressed with something, and the discussion of this in relation to the specialist, how the special anatomic factors in relation to pathology of such an organ as the ear have such direct bearing upon the symptomatology, convinces me that the subject can only be pursued with advantage by those who are directly associated with the clinical phenomena. And it seems to me, further, that such a study of pathology is one of the most important means of advancing that particular specialty. In regard to this subject, I am very much impressed with how little is known definitely as to the anatomic distribution of syphilitic lesions within the ear. Of course, the difficulty of making anatomic observations is very great. Indeed, the descriptions of the local effect of syphilis on different parts of the ear, so far as the slight investigations I have made of the literature on the subject, strikes me particularly unsatisfactory. From the standpoint of general pathology, one feature is to me particularly interesting; that is the fundamental reason for the location of syphilis in the ear, because the same thing applies to the localization of syphilis on any part of the body, indeed, but especially in relation to the syphilis of the nervous system.

Dr. Stein, in closing: I would just like to say again that I have had cases of deafness following the treatment with salvarsan, but none of them have persisted any length of time. I know of no single case I can recall that has any permanent impairment of hearing as the result of any treatment I have given them by this method. I have had involvement of hearing immediately after the introduction of the salvarsan, but it quickly cleared up. I will admit I know nothing definite about the subject, as I was just stating my own experience and trying to relate the experiences of others, but it is possible that this remedy has a slight toxic action, as Dr. Wilson says, for the eighth nerve: but if that is true, it seems strange that among the hundred thousand of cases injected and treated by this method, that there are not more cases reported of paralysis—it is almost inconceivable to think there can be such a selective toxic action. I hardly feel as if we can take any of the cases reported, or many others of apparent permanent deafness, very seriously until we know more about how these cases were treated. It is necessary to know the exact details of the amount used, of the method employed, and the period over which they were treated. Upon all this hinges the recovery of their deafness. The discussion has been confined almost entirely to the salvarsan feature of the paper, which I wanted to eliminate as much as possible. I was particularly anxious to hear some of the St. Louis gentlemen discuss the case of intracranial syphilis that I reported, but was sadly disappointed.

Paper: A Study of the Etiology of Nasal Hydrorrhea, With Case Reports.*

By Harry Kahn, M. D.

DISCUSSION.

Dr. Sluder: I was greatly interested in the doctor's paper. This has been a subject of much interest to me. I agree that it is in all probability, at least as far as we can make out, an involvement of the sympathetic. Where that involvement lies, though, is to my mind exceedingly difficult to locate. Some ten years ago Dr. Stein began the injection of the posterior nerve supply, which is tantamount to the ganglion, also the anterior nerve supply. I have not spoken with him for a long time to know what his ideas are concerning the anterior supply, but I believe that his ideas concerning the posterior supply are unchanged. At a point further back this same sympathetic supply is exposed in the sphenoidal sinus, and one of the most intractable of these cases I have seen at any time followed sphenoidal empyema. The underlying lesion I believe to be a hyperplastic sinusitis which, so far as I know, is not described; a condition which presents the same picture that it was my privilege to see the gentleman demonstrate this afternoon, following Dr. Kahn's idea. Later I began the intraspinal application of various things, and for this particular patient a 5 per cent solution of salicylate of soda, which proved to be almost magic in itself. It checks up the sneezing, it controls the swelling, and rapidly diminishes the swelling that follows in acute inflammatory conditions, and has been almost specific. On the other hand, in an experiment, menthol aggravated it into a condition that required a grain of morphin to overcome the intense discomfort thereby produced.

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*See page 184.

Dr. Stein: My interest in this subject of nasal hydrorrhea was aroused at the time we were doing our work some years ago with alcohol injections in the attempt to treat hyperesthetic rhinitis. At that time I was considerably encouraged by two confreres to extend my efforts to checking this disorder of nasal hydrorrhea, instead of confining my treatment to the hyperesthetic type of rhinitis. The first case I tried it on was a woman who had been exposed to dust from a long automobile ride, producing a very severe attack of watery discharge from both nostrils, swelling about the eyes, etc. She was treated by the injection of the anterior nasal nerve with an 85 per cent alcoholic solution. Immediately we had the characteristic reaction of severe pain, following the course of the distribution of these nerves, and from that moment there was no further discharge. I particularly avoided in this case any suggestion whatever as to the effect of the treatment. I was anxious to find out whether it would have any beneficial effect or not, so I made no promise. I merely said I would try this and see what it would do, that it might be of benefit. This result lasted one month, when she returned to me with a slight attack, the following day. I injected her again and that terminated her trouble. I have had occasion to inject a few more cases of this disorder in the same way, using a milder solution of alcohol—65 per cent—and in all of the cases, barring three, it has been successful. Of these three one was a Chinaman, brought to the clinic with a mass of nasal polypi and a most profuse watery discharge, so I thought it a good case to try it on. We first injected, afterwards operated on him, but there resulted no improvement until the polypi were all removed. I believe that some of these cases are caused by such primary disturbance as a polypi hidden away like that. Since hearing Haskin's paper on the relationship between the sympathetic nerve and the fifth nerve, I have become a convert to the belief that this disorder is purely one of sympathetic character or a vasomotor disturbance.

Dr. Scholz: I agree with Dr. Kahn in his assumption that nasal hydrorrhea is the result of a disturbance in the nervous system. In an individual with a hypersensitive nervous system, a very slight point of irritation in the nose is sufficient to precipitate the nasal phase of the disease. While I believe that nasal hydrorrhea rests upon a disturbance in the nervous system, I feel there may be some general ailment to account for the latter, and we must not lose sight of this fact in the treatment of these cases. A case which I have had under my observation for several years clearly illustrates this fact. The wife of a prominent physician, who has always had the best of attention, perfect home surroundings, and is free from worry and care, etc., had long been suffering from nasal hydrorrhea. At the time I examined her I found the tissues about the middle turbinates hypertrophic and edematous. Feeling that the local nasal lesion was probably the exciting cause, I directed my attention to the correction of the same, but all treatment along these lines failed. A more thorough general examination of the patient was then made by Dr. Jesse Myer, and it was found that she was anemic; the blood being very low in hemoglobin. The patient was then treated for her anemia and her run down condition, and as the hemoglobin approached normal, the nasal hydrorrhea grew milder, and at last ceased entirely; even the local nasal lesions cleared up. Not long after this the patient gave birth to a child, and shortly thereafter the nasal hydrorrhea returned. But again treatment for her anemia gave prompt relief. She has had several attacks since, but invariably these were controlled by general treatment. While one case cannot permit us to come to a conclusion, I still feel that we must not lose sight of the general health of the patient in this condition.

Dr. Kahn, in closing: I want to thank the gentlemen for their discussion. I purposely omitted the hyperplastic ethmoiditis because that per se does cause a hydrorrhea. My thesis deals only with cases with no anatomic pathologic lesion other than in the mucous membrane.

As regards the doctor's case, that might occur and has occurred; and even in my own case of hydrorrhea the blood was absolutely negative, the patient showed no physical findings, and yet had the hydrorrhea; so there must be something in the nose which causes these hydrorrheas which demonstrate themselves only from the mucous membrane of the nose.

Esophagoscopy.*

By Stanton A. Friedberg, M. D.

DISCUSSION.

Dr. L. K. Guggenheim: I should like to mention in connection with this subject a case which very beautifully illustrates the possibility of finding something other than a foreign body when a foreign body case comes to one. We all know that the majority of foreign bodies in the esophagus pass down into the stomach before a patient consults the physician, the abrasion or bruise caused by it being misinterpreted for a lodgment in the esophagus, etc. This particular case gave the history of having swallowed too large a piece of pig's foot, which became lodged in the esophagus, and for two weeks prior to the time I saw the patient he had been unable to swallow any solid food. I went in and found no evidence whatever of the pig's foot; instead, I found a very beautiful, pathologically speaking, cancer of the esophagus. The obstruction caused by the new growth made it difficult for the large piece of pig's foot to pass. There resulted an increase in the previously existing obstruction which, in turn, resulted in the patient's thinking that the pig's foot had remained in the esophagus.

Dr. Scholz: I would like briefly to relate the histories of two cases which I believe to be instructive, the first, because of the size of the foreign body swallowed. A young man swallowed a ten inch, four pronged table fork. Radiograms were made which showed the fork lodged in the upper portion of the esophagus, prongs up. When I examined the patient with the esophagoscope, several hours later, I failed to find the fork in the esophagus. Dr. Max Myer removed the foreign body from the stomach by means of a gastrostomy.

The other case is instructive because of certain phenomena which led to an error in diagnosis. A man, about fifty years of age, was referred to me because of difficulty in deglutition, and for the purpose of an esophagoscopy. While making the usual preliminary examination of the patient, I found that the radial pulses could be readily palpated, but as the arms were gradually raised, the left grew weaker, and was not at all palpable when the arm reached the level of the shoulder. The examination of the chest revealed an area of increased dullness about the arch of the aorta. A distinct purring bruit could be heard, so that a diagnosis of probable aneurism was made. Dr. Horace Soper, who was in consultation at the time, made a fluoroscopic examination and found a pulsating mass of about the size of one's fist in the region of the aorta. When the patient swallowed a bismuth mixture, a shadow could be seen to pass down to about the level of the arch of the aorta, here to hesitate a moment, and from here deflected to the left several inches, in about the course of a semicircle, then seen to find its way freely to the stomach. We felt our tentative diagnosis of aortic aneurism was correct, and for that reason did not pass the esophagoscope, but postmortem examination revealed a carcinoma about the size of a large orange, springing, most likely, from the bronchial lymph glands. The tumor had broken down in its center, the mass having ruptured into the esophagus above, and a second fistulous tract from the cavity in the tumor communicated with the esophagus below, so that the bismuth swallowed had in reality left the esophagus, passed through the tumor mass, and then returned to the esophagus by means of a second fistula. This case has been put on record by Dr. Horace Soper.

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*See page 123.

Dr. Beck: I want to call attention to one point in Dr. Friedberg's paper, and that is his criticism of the unreliability of the X-ray in properly locating the foreign body, to the effect that one position shows the foreign body at one level and another position reveals it at an entirely different location. This criticism, while true of single pictures, will not hold good with reference to stereoscopic roentgenograms, in which the foreign body is seen always in the same location.

Dr. Sauer: I think the most important point is the size of the foreign bodies, for I have observed that it is much easier to find a large foreign body than a small one.

Dr. Friedberg, in closing: Just one word. We cannot afford to miss a coin, as in many instances that is the only remuneration that one obtains from this variety of cases.

ABSTRACTS FROM CURRENT LITERATURE.

I.—EAR.

Diagnosis, Prognosis and Treatment of Cervical Abscesses of Aural Origin.

Deodato De Carli (*Jour. of Laryngology,* January. 1913), considering diagnosis, prognosis, and treatment of cervical abscesses of otitic origin, says superficial adenitis is characterized by a small painful tumor of rapid formation. If pus can be squeezed out of the ear on gently pressing the neck, the diagnosis is certain. Deep cervical abscesses, the socalled Bezold's mastoiditis, present difficulties: there is a slow formation of a swelling at the insertion of the sternomastoid and tendency to spread downwards, backwards, with limitation of movement of the head. Pus is too deep for fluctuation to be perceived. Left to themselves cervical abscesses tend to spread to the mediastinum, following at first natural ways and then breaking these barriers. Treatment should begin at the ear as soon as a presumptive diagnosis can be made. *Richards.*

Some Notes on Scarlet Red as a Dressing After the Radical Mastoid Operation, Based on the Observation of Fifteen Cases.

Thos. W. E. Ross (*Jour. of Laryngology,* April, 1913) reports on the use of scarlet red (amidoazotoluol with B. naphthol) in fifteen cases of radical mastoid as an after-dressing to hasten epithelization of the wound cavity. The periods varied from twenty to forty-four days, the average being five weeks. The use of the red ointment is best delayed until healthy granulation has been set up by the use of bismuth gauze: the red ointment is then applied for periods of forty-eight hours, ribbon gauze saturated with the ointment being the medium. An interval of twenty-four hours is left between each application, when bismuth gauze or eucalyptus vaselin is to be used. A temporary increase of discharge may be expected after the first one or two applications. The method requires careful supervision to prevent exuberant granulations and the formation of pockets. The contour of the cavity is well maintained and the epithelium is strong. *Richards.*

The Significance of Fever in Cases of Mastoiditis Complicating Acute and Chronic Suppurative Otitis Media.

Raymond Verel (*Jour. of Laryngology,* May, 1913) has analyzed one hundred and twenty-five cases of mastoiditis with reference to the question of fever in connection with involvement of the mastoid. In ninety-six, or 77 per cent, of the cases of acute mastoiditis complicating acute and chronic otitis media there was no fever (temperature of 100° F. or over).

Out of the twenty-nine cases in which fever was present. an intracranial complication was found in twenty-two cases; and in two of these the temperature could be explained by the presence of such condition as septicemia and pulmonary tuberculosis. In two cases there was no mastoiditis. In only three cases (2.4 per cent) no condition other than the mastoiditis was found at operation to account for the fever. Thus mastoiditis of itself very rarely gives rise to fever (temperature of 100° F. or over): if fever be present, we must suspect an intracranial complication or some general toxic condition.

Richards.

The Jarisch Herxheimer Reaction in the Organ of Hearing After Treatment by Salvarsan.

Karl Theimer (*Jour. of Laryngology*. May, 1913. p. 225), since the introduction of the salvarsan treatment, has noticed that a not inconsiderable number of cases have been described in which injury to the internal ear had to be recorded. These affections are of the internal ear, of the vestibular or of the cochlear apparatus alone, or of both together, in patients who are already subjects of an aural lesion. In some of these cases the phenomena disappear in the course of time, some after repeated salvarsan treatment. some after mercurial treatment. In others the lesions proved to be permanent.

He noticed affections of one or both sections of the internal ear in persons whose ears had been previously proved to be normal. The phenomena appear a long time—weeks or months—after injection. Here, also, the symptoms may disappear after a time, or they may persist.

Affections of one or both sections of the internal ear in persons whose ears have been previously proved to be normal, appear immediately or shortly after the injection. They persist for a long time, and may prove to be permanent.

An affection of the internal ear, attacking by preference the vestibular apparatus solely, appears immediately or soon after the injection, and disappears as rapidly, at most within a few days, and so completely that the phenomena become absolutely normal again.

The only cases of injury to the internal ear after salvarsan which can be described as manifesting the Herxheimer reaction are those in which the phenomena appear shortly after the injection and rapidly disappear. The disturbances affect the vestibular portion of the nerve for the most part, and, as a rule, induce the clinical appearances of a complete paralysis of the vestibular apparatus. *Richards.*

The Treatment of Meningitis of Otitic Origin.

Wm. Milligan (*Jour. of Laryngology,* May, 1913, p. 242) considers the successful treatment of meningitis is dependent upon early diagnosis and early drainage. Special knowledge is required in order to make an early diagnosis, and courage to operate in the absence of the full ensemble of textbook symptoms. The localized form known as extradural abscess is often a more common complication of acute than of chronic otitis media, and more frequently found in the posterior than in the middle fossa, and also with frequency are encountered extradural collections of pus when their existence is quite unsuspected. Diminishing alkalinity denotes progressive bacterial invasion, while an acid reaction indicates that definite purulency has become established. All cases of purulent meningitis are preceded by a stage of serous meningitis, when a desperate fight is made by the meninges and cerebrospinal fluid to resist bacterial invasion. Metabolism of the products of bacterial life is such as to destroy or partially destroy the existing carbohydrates or proteins in the cerebrospinal fluid. There is a certain test (Kopetzky) for determining when serous meningitis is becoming purulent. So long as the cerebrospinal fluid remains alkalin, even though turbid, there is reason to expect a good result from operative interference, but should it become turbid and acid the prognosis is grave. Bacteria are not found in films or in cultures in the early stages of the disease. It is at the stage of the disease when the cerebrospinal fluid, although possibly turbid, is still alkalin and capable of reducing the copper in Fehling's solution, that lumbar puncture as a therapeutic measure is so advantageous. The use of urotropin is said to have a beneficial effect, and to assist in keeping the cerebrospinal fluid aseptic. Its rapid elimination, partly as a formaldehyd, and the fact that it is found in the cerebrospinal fluid soon after its administration by the mouth, has given rise to the idea that it might possess a certain antiseptic value. To be successful any treatment of otitic purulent meningitis presupposes elimination of the primary focus of infection, whether it be a middle or an internal ear suppuration, or, as is so frequent, of the two combined. The internal ear is not only by far the most frequent avenue of infection to the meninges, but is also the most dangerous, because it leads to direct infection of the posterior fossa. Milligan has performed the Haynes' opertion twice, but in neither case did the patient survive. His records show thirty-seven cases of meningitis serosa socalled, with twenty-nine recoveries and eight fatal cases. In these eight cases the cerebrospinal fluid became definitely purulent, and although one or other form of decompression operation was performed, it was unsuccessful. Of fourteen cases diagnosed at the time of admission to hospital to be suffering from purulent meningitis and submitted to operation, ten died, and in four cases it would have been wiser to have attempted no operation, while the remaining six cases that died had a sporting chance of recovery. Four, or 40 per cent, recovered.

Milligan also states that if he had a case of chronic suppurative middle or internal ear disease, with the temperature going up and arterial tension increasing, with diminishing alkalinity of the cerebrospinal fluid and absence of copper reduction on boiling with Fehling's solution, he would recommend a decompression operation, because such a case was obviously tending toward purulency, and one was justified in operating at once to prevent it.

Dr. Dan McKenzie emphasizes the diagnostic importance of pain—occipital headache associated with some rigidity of the neck. In early meningitis one can elicit early rigidity of neck muscles. Occipital headache, whether combined with this rigidity or not, should lead to lumbar puncture and examination of the fluid. *Richards.*

Erysipelas Following the Radical Mastoid Operaiton.

J. S. Fraser (*Jour. of Laryngology,* September, 1913). Erysipelas, according to Fraser, is much more common following the radical mastoid operation than is supposed. He reports one case of erysipelas in which the correct diagnosis was not made until the fifth day after operation, because of the fact that for two days after operation all signs and symptoms indicated a mild meningitis, and it was not until on the fifth day that the erysipelas blush appeared. In this instance there was a marked nystagmus to the diseased side, which disappeared on the fourth day, and also all signs of the supposed meningitis. The nystagmus was attributed to some irritation in the posterior fossa. Erysipelas, according to Ruttin, in its early symptoms is very hard to differentiate from intracranial complications. The severe headaches, tenderness on pressure, high temperature and slight stiffness of the neck may be present before the erysipelas blush appears on the skin. Spontaneous nystagmus on looking to the side is a common symptom of postoperative erysipelas, and may be due either to serous labyrinthitis or some intracranial causes. The nystagmus varies its direction and intensity, and may occur along with the fever and headache before the skin becomes red, or it may accompany the erysipelas, disappearing before the fall of the temperature or along with it. The total duration is only a few days. The return of erysipelas may be indicated by a fresh occurrence of nystagmus. *Richards.*

The Operative Treatment of Labyrinthine Vertigo in Nonsuppurative Disease of the Internal Ear.

William Milligan (*Jour. of Laryngology,* October, 1912, p. 521) limits surgical intervention to those cases which have failed to respond to prolonged general and local treatment, and to those in which, from the circumstances of the patient, it is necessary to secure a rapid destruction of an overexcited and irritable labyrinth, as determined by the caloric and other tests.

Postoperative increase of deafness hardly requires consideration, as with an increase of irritative symptoms there is a progressive loss of hearing; in addition to which the amount of hearing at the time of the contemplated operation is, as a rule, so small as to be almost a negligible quantity.

In careful hands the risks of facial paralysis are not great, provided that the field of operation is kept thoroughly well illuminated; that some form of labyrinth chisel (e. g., Lake's) is used to open the semicircular canals and the cochlea, and that no attempt is made to lever out pieces of bone, utilizing the bony wall of the fallopian aqueduct as a fulcrum. The destruction of the terminal filaments of the vestibular nerve should be as thorough as possible. Practically, the more thorough the operation is performed, the less the amount of post-operative shock. For this reason, the complete opening up of the external semicircular canal and of the ampullary orifice of the posterior canal is advocated, in order to effectually destroy the peripheral terminations of the vestibular nerve.

When tinnitus is not much complained of, and when it is worth while attemtping to preserve whatever auditory function is still left, operative interference should be limited to the opening up of the external semicircular canal and vestibule after the performance of an ordinary Schwartze operation. In performing a Schwartze operation with this object in view, the opening through the bone should be made as large as possible, so as to freely expose the bony covering of the external semicircular canal which lies at the bottom of the excavation.

The external semicircular canal should now be opened with Lake's chisels, and followed both forwards and backwards to the vestibule. Should difficulty be experienced in reaching the ampullary orifice of the posterior canal from the vestibule, the canal should be opened farther back and followed forwards. A careful and very thorough curetting of the vestibule should now be made, followed by swabbing with some strong antiseptic. Healing is invariably rapid, provided there is no sepsis, and complete relief from vertigo should be secured in from five to six days. If vertigo persists longer, the deduction is that the operation has not been thoroughly performed; that is, that the peripheral terminations of the vestibular nerve have not been thoroughly destroyed. By working forwards and backwards along the course of the external canal the vestibule is opened. The fossula rotunda is then enlarged, and the bony wall of the cochlea between the fenestra rotunda and the fenestra ovalis, along with the stapes, removed, thus leaving the bony walls of the fallopian aqueduct standing out like the arch of a bridge (end on, as it were) between the cochleavestibular system in front, and the canaliculovestibular system behind. *Richards.*

Diseases of the Middle Ear and Mastoid Cells Based Upon a Study of 454 Autopsies and 2,232 Cases of Diphtheria, Scarlet Fever and Measles.

C. R. C. Borden (*Boston Med. and Surg. Jour.*, February, 1913). In measles, middle ear and mastoid symptoms occur during the height of the active process, and adults are particularly subject to mastoiditis. In scarlet fever, middle ear involvement comes at any time during the course of the disease, and is not limited to the active stage. Adults are not very liable to mastoiditis in scarlet fever. In diphtheria, otitis media or mastoiditis are not as active as in scarlet fever or measles; thus, diagnosis is far more difficult to make.

With active inflammation in the heart, lungs or joints, infection of the middle ear or mastoid cells causes the inflammation in these organs to become more active and dangerous to the life of the patient, but usually these inflammatory processes are much relieved after a prompt and efficient treatment of the aural inflammation.

Next to bony tissue itself, bony cavities lined with mucous membrane are among the lowest in resistance of all tissues of the human body. So long as the phagocytes and the antibodies have sufficient power to overcome the bacterial invasion, no systemic symptoms occur. For this reason infected middle ears occasionally smoulder for weeks before showing active symptoms.

Often with the appearance of active symptoms in the heart, lungs, or joints, one or both middle ears show marked signs of inflammation, or spontaneously rupture. If at such times the middle ear or mastoid cells send bacteria into the blood stream, the devitalized organs are in a position to absorb them, and they themselves become foci of infection to still further increase the toxemia of the patient.

The author cites four cases of diphtheria patients who were not particularly ill upon entering the hospital. Each improved or showed no symptoms for sixty-seven, forty-four, eight, and ten days, respectively. Then they developed weakness or prostration, and gradually died without any definite symptoms.

The autopsies showed all of them to have had double acute middle ear disease; and three of the four cases, either single or double mastoiditis. Not one of the four showed any reason to suspect the middle ear during life.

In view of the large percentage of aural involvement in very sick and fatal cases, the closest possible watch must be kept on the middle ear. Such close observation will reveal many inflamed and swollen drum membranes. Once determined, this condition is easily handled; but as distinct stereotyped symptoms are lacking, the observer should carefully look for the merest suspicion of trouble in this locality and possess sufficient skill to note the slightest trace of altered natural conditions.

To establish drainage in a comparatively healthy patient is simple enough, but to keep such drainage open in a very sick patient is entirely a different matter. Repeated drum incisions are often called for and should be resorted to as long as necessary. Ether operation should be avoided as much as possible when important organs are involved; but they are never absolutely contraindicated when necessity demands. Very sick persons will take ether better than would be supposed. The free drainage of pus, with its attending toxins, will do far more good than ether with its irritation to inflamed tissue will do harm.

Ice bags should never be used in patients seriously ill with contagious diseases. The development of symptoms in the middle ear or mastoid should be encouraged as much as possible. Ice bags or other methods of cold application very effectually mask the symptoms, and should be absolutely avoided.

The matter of prompt and thorough treatment cannot be too strongly emphasized. Practically every case of brain abscess and every infected jugular vein is the result of failure to diagnose and treat comparatively simple conditions in the early stages.

The author bases his remarks upon the following clinical cases:

SCARLET FEVER.

Total number of cases	746
With otitis media	65—11%
Without otitis media	681

MEASLES.

Total number of cases	456
With otitis media	125—28%
Without otitis media	331

DIPHTHERIA.

Total number of cases	962
With otitis media	28—2.9%
Without otitis media	934

MIXED INFECTIONS.

Total number of cases	68
With otitis media	30—44%
Without otitis media	38

Total number of cases, 2,232. Number of autopsies, 333.
Richards.

Tibial Bone Transplantation in the Postoperative Mastoid Wound.

Millton J. Ballin (*Medical Record*, March, 1913). In order to hasten healing in the mastoid wound and to lessen postoperative deformity, Ballin has in three cases transplanted a piece of bone with periosteum attached from the tibia of the patient to the mastoid wound and then sutured the skin. The portion removed is cut to fit the mastoid cavity, which must have good granulations. The operation is done about ten days after the original operation, and if the case goes well, healing is complete a few days thereafter. The cavity underneath its bone graft fills with blood clot which later organizes into bone. For hard eburnated mastoids the procedure is not indicated. It has so far been used in but three cases. Preservation of the periosteum of the transplanted bone is essential.
Richards.

The Treatment of Persistent Otorrhea in Infants and Young Children.

Wendell C. Phillips (*Med. Record,* July, 1913) describes a type of persistent otorrhea in children which appears at first as an acute middle ear suppuration, usually following one of the exanthemata, grip, or pneumonia. The discharge from the onset is profuse and persistent, continuing beyond the third to seventh day after the temperature has become normal and the pain has subsided, and there is no marked dropping of the posterosuperior canal wall. When the discharge continues longer than three weeks, and does not yield to local measures, there is suggestion of involvement beyond the tympanic cavity of the aditus and mastoid antrum, and the author in such cases has obtained excellent results by establishing postauricular drainage, and hence through and through drainage, by means of the simple mastoid operation. In young children, when the operation has been performed any time between four weeks and three months, the results have been excellent. In patients with markedly hypertrophied tonsils and adenoids, when the purulent otorrhea has extended beyond the temperature stage, it is best to delay postauricular drainage until after the removal of the tonsils and adenoids. The advantages of this operation are that it terminates quickly an otherwise persistent otorrhea, prevents a chronic purulent otitis media, insures against further extension of local bone necrosis, and restores and retains the hearing function.

Richards.

Sinus Thrombosis of Otitic Origin.

S. J. Crowe (*Johns Hopkins Hosp. Bull.*, November, 1912) thinks that any acute obstruction to the outflow of blood through the sigmoid sinus, jugular bulb or internal vein on one side may be diagnosed by means of the following test. This test is based on purely mechanical principles. The anatomic conditions are schematically represented in the accompanying diagram:

1. No appreciable evidence of stasis is seen in the retinal or supraorbital veins when one internal jugular is compressed with the finger.
2. Pressure on both internal jugular veins at the same time produces a marked dilatation of the veins of the fundi and of the anastomotic vessels connecting the intracranial with the extracranial venous circulation.
3. When the pressure is suddenly released on one side, while it is maintained on the other, the engorged veins of the anastomotic system and the fundi will immediately empty.

If the results in any individual case differ markedly from those above, it must be concluded that there is either an anomaly of the intracranial venous circulation, or some pathologic condition which is obstructing the outflow of the blood from the brain.

During this examination the patient should breathe freely and naturally: the collar should be loosened so as to expose the neck and upper part of the chest: the fundi should be examined by the direct method, or with an electric ophthalmoscope, while an assistant compresses the jugular veins with the tips of the finger. The compression should not be maintained longer than absolutely necessary, for it may be possible in this way to rupture a diseased vein or dislodge a portion of the thrombus.

Among clinical conditions associated with an obstruction to the outflow of blood from the brain, the formation of a thrombus in the sigmoid sinus, secondary to an infection of the middle ear, is by far the most frequent and most important. Sinus thrombosis appears with equal frequency as a complication of acute and chronic cases of otitis media, and not infrequently the diagnosis offers great difficulty. Due to the anatomic position of the jugular bulb in the middle ear, it is possible to have a primary bulb thrombosis, with the sigmoid and transverse sinuses normal in appearance: and the condition may not be recognized, even at an exploratory operation. One of the cardinal symptoms of sinus thrombosis is a remittent fever with chills, due to the serious nature of the malady; it is desirable to know at an early stage of the disease whether the symptoms are due to a sinus thrombosis or to other conditions such as angina, pneumonia, malaria, the initial stage of one of the infectious diseases of children, meningitis or brain abscess. *Richards.*

Temporosphenoidal Abscess.

Francis P. Emerson (*Jour. Amer. Med. Assoc.*, September, 1913) employs in cases of brain abscess the Haynes operation for drainage through the cisterna magna, and does not consider it a difficult procedure. It is doubtful whether the Haynes or any other procedure is effective except in the early stages of a purulent meningitis. This may depend on whether the infection is always accompanied by edema and serous effusion. It is possible, as a primary manifestation, that there might be a plastic exudate, fibrinous in character, which would not drain until a later stage, when it became purulent. Even if this were so, a decompression operation might so relieve the intracranial pressure that the patient would have a chance to survive until the leucocytes could take care of the exudate. The author reports in detail a case of temporosphenoidal abscess with recovery. In this instance the pressure of a large brain abscess made the diagnosis of a general meningitis uncertain. Three or four weeks after operation, a slight blocking of the cisterna magna caused hiccoughs and vomiting. In cases of brain abscess it is very important to keep careful watch of the drainage, even weeks after the operation, and the cigarette drain is the ideal method. *Richards.*

The Radical Ear Operation.

Cullen F. Welty (*Jour. Amer. Med. Assoc.*, September, 1913) reports some excellent results in hearing after a radical ear operation by improved Thiersch grafts applied at the time of operation. In a series of eighteen cases there was improvement in hearing in 78 per cent, no change in two, or 11 per cent, and the hearing was made worse in 16 per cent. In six cases the whisper, after operation, was heard from a distance of twenty-five feet or more; in three cases, fifteen feet or more: in three cases, six feet: and in three cases it was made worse because of complication before or after the operation. In four cases the duration of after-treatment was three weeks: in ten cases, four weeks: in one case five weeks, and in three cases six weeks. He allows for improvement in hearing if there is lengthened or normal bone conduction and the patient does not hear a whisper from a distance of more than six to nine feet. In all patients under fifty years of age who hear a whisper from a distance of five feet or less, hearing will be improved unless something goes seriously wrong with the operative procedure, such as removing the graft too soon (so that granulation tissue takes its place), or allowing it to remain permanently, in which case it will act as a mechanical hindrance. In patients who hear a whisper from a distance of twenty feet or more, there is an improvement in hearing. In patients who hear a whisper from ten to fifteen feet, there can be no guarantee of improved hearing. Provided the patient has an intact labyrinth, and the hearing for a whisper is below ten feet, there is certainty of improvement.

Richards.

Chronic Obstructive Middle Ear Deafness.

Geo. E. Shambaugh (*Jour. Amer. Med. Assoc.*, September. 1913) suggests, in place of the term "chronic catarrhal otitis media," the use of the terms "chronic simple otitis media" and "chronic nonpurulent otitis media," as better conveying the fundamental conditions of the cases, which is that of infection in the membrane lining in the middle ear chamber, with round cell infiltration and thickening and subsequent formation of fibrous connective tissue. This process is from time to time associated with an acute infection in the nasopharynx, and at these times secretion can usually be detected in the tympanum—not by inspection of the drum membrane, but by inflation of the tube. The chronic middle ear process may or may not be associated with a persisting tubal occlusion. The membrana tympani, even when the drum membrane is not retracted, usually appears more or less thickened and opaque—enough so, to indicate the type of process involving the membrane lining the tympanum. The degree of retraction of the drum membrane is no index to the defect in the hearing or of the improvement to be expected from inflation. Prognosis as regards progress of the deafness is better if the occlusion of the tube has disappeared and the existing defect is dependent upon changes in the tympanum which has ceased to be active, which the open tube indicates. Persistent tubal occlusion indicates a still active process and further increase in deafness. The presence of secondary changes in the labyrinth gives a bad prognosis; and the labyrinth defect is best detected by noting the defect for the higher notes of the Galton whistle. The defect in hearing found in cases of persistent tubal occlusion, especially if secretion is in the tympanum, is more readily improved by treatment.

Richards.

Radical Mastoid Operation in Children.

David G. Yates (*Am. Jour. Surgery*, August, 1913) only performs the radical operation in children when there is necrosis in both the middle ear and mastoid cells, or when the middle ear is so far damaged that it cannot be restored to usefulness even if suppuration should be arrested. The presence of a foul discharge, of cholesteatoma, of polypi or granulations, of displaced ossicles, of fistulæ leading into the attic or back toward the aditus ad antrum, point to the necessity of a radical operation. Enlarged tonsils and adenoids undoubtedly influence acute inflammation of the middle ear and frequently help to keep up the discharge; their removal will not cure an otorrhea that arises from dead bones. Children under three or four years of age with chronic suppuration may, as a rule, be treated on the expectant plan. Children from five years of age and upward, with discharging ears of two or three years' duration and with growing deafness on the affected side, who have not yielded to persistent local treatment, are submitted to the operation. Every physician knows the dangers attending a chronic running ear and its possible complications, and if an operation can be perfected which will not endanger life, which will preserve a useful degree of function, and leave no deformity, it is the thing to choose rather than to allow suppuration with all its uncertainties and dangers to go on indefinitely.

Yates in his technic places special emphasis upon his incision, which begins at a point midway between the meatus and mastoid tip, is curved sharply backward and ends at a point above the meatus; thus made, the incision allows the sutured edges to have support, at least in part of their extent, after operation is completed. The incision is carried through skin, muscle, and periosteum as far upward as the lower border of the temporal muscle, where the skin only is cut through. Where a previous simple mastoid has been performed, it is necessary to cut through the scar. Elevation should not be attempted until the periosteum is thoroughly incised and the bleeding stopped. This done, elevation of the whole thickness of the flap is easily accomplished without bruising or mauling the tissue—an important factor in the healing. In very young children, when the bone is found hard and barren of cells except for a small antrum lined with necrotic membrane and filled with granulations, it is better to perform the Stacke operation and simply clean out the antrum and middle ear, thereby throwing them into one cavity and leaving the greater part of the mastoid cells untouched. In children great care is used not to too zealously curette upon the internal tympanic wall and in the region of the round and oval windows.

The plastic flap is so made that when completed the meatus is about one-third larger than normal, it is round and oval and not noticeable. In making the flap the membranous canal is split up to the margin of the concha with a straight, blunt-pointed knife, which is then turned at right angles to this incision and a cut is made curving to the floor of the meatus and thereby allowing the lower flap to drop freely to the bottom of the bony cavity. A similar cut is made upward, starting again at the end of the first incision. Then enough fibrous tissue is dissected away from the skin flaps to fit snugly into the walls of the bony cavity. In case of too abundant tissue, a triangular section is cut out and the flaps anchored in position by a single catgut suture.

The after-treatment consists in removing the cotton balls which are used to hold the graft in position; these are removed two to four days after operation and the cavity treated by tamponing with gauze until epithelization is completed. For cleansing purposes simple saline solutions are used, and in cases of exuberant granulations applications of silver nitrate are used. *Richards.*

Operative Treatment of Otitic Meningitis.

Ewing W. Day (*Jour. Surg., Gyn. and Obsts.*, April, 1913) reports on the indications for and the results of operative treatment of suppurative otitic meningitis. There were fifty-seven cases treated since 1897; fifty-three of otitic origin, two from the nose, and two following pneumonia. They were all cases of diffuse suppurative meningitis, diagnosis being confirmed in thirty-eight cases by autopsy. Four cases recovered, three after operation, and one after vaccine therapy. One of the operated cases died later from a reinfecting meningitis.

Meningitis followed chronic purulent otitis and its acute exacerbations. Seven cases were complicated by sinus thrombosis, ten by purulent labyrinthitis. In forty-eight cases a mastoid operation, either simple or radical, was performed, supplemented in thirty-three cases by other procedures directed to the infected meninges: in ten cases by dural drains: in eight by simple incision of the cisterna magna; in one by drainage of the lateral ventricle; in one by lavage of the ventricle; in four by intraspinal injection of urotropin solution; in two by intraspinal injection of oxycyanid of mercury.

For diagnosis the lumbar puncture gives us the most reliable information as to the condition of the meninges. Slight turbidity cannot be accepted as a positive sign of a diffuse process, for it may result from a very limited area of infection. In serous meningitis a slight turbidity with a markedly increased number of polynuclear leucocytes in the presence of pyogenic organism, indicates an extensive involvement and a correspondingly hopeless condition.

It has been said that the findings from examination of the spinal fluid might under certain conditions lead to a diagnosis of a more serious condition than really existed, but Day did not find this to be the case. In three cases the examination of the spinal fluid led to the underestimation of the gravity of the brain condition. In these, repeated punctures showed a slightly clouded fluid, nonpathogenic bacteria, and leucocytes, but no infective organisms. On postmortem examination streptococci were obtained in abundance, both by smears and culture from the dural spaces. The bacteriology of the primary aural infections offers no indication for or against operative interference. The organism found in the ear at time of examination will not always be identical with that in the dura. This is especially true in chronic purulent otitis media. The course of the disease is more influenced by the virulence of the infecting organism.

The cases were treated either singly or in combination with injection of drugs into the spinal canal, vaccines and sera, or operation. The treatment of suppurative meningitis by the administration of drugs has proven useless, with the possible exception of the use of urotropin as a prophylactic. Theoretically, surgery should give relief. Practically, the mortality has not been changed by it.

Urotropin was used intraspinally in four cases. Three of these had streptococci in the spinal fluid, and one pneumococci. There was improvement in only one case, a streptococcic. Intraspinal injections of oxycyanid of mercury were used in two cases, but without results, for any benefit derived in the meninges from the drug was offset by inflammation in the bladder and kidneys, acute enough to cause early death. The results of vaccine therapy have been such that it has been discontinued.

Operative procedure in otitic meningitis should aim first as a prophylaxis, and second at a radical cure. A prophylactic operation eradicates the primary focus in the middle ear and adjacent bony cavities, thus preventing the spread of infection to the meninges. As a curative measure, when meningitis has actually developed, it is of little use in arresting the inflammation and should only be considered as a minor part of the operative procedure.

With no signs of infection beyond the temporal bone, no useless exposure of the dura to possible infection should be considered. With the use of the dural drain it has been concluded that the drain does not satisfactorily drain the central lobe of the cerebellum or lessen the inflammatory action over the base of the brain or spinal cord. The drainage of the cerebral fluid, which occurs at first after the operation and which generally ceases in from twenty-four to thirty-six hours, does not stop from plugging around the bony opening, but causes the brain pressure to destroy the spaces no longer distended by the fluid, and permanently seals them off from the remaining arachnoid. Three cases were treated by drainage of the cisterna magna, an area wider and higher up than dural drainage in the temporal region. The dural drainage is effective, but to a limited extent. When used in the circumscribed form of the disease, it should and does give good results. The successfully treated cases reported in literature are probably of this class. *Richards.*

Regeneration of Membrana Tympani.

Geo. M. Coates (*Laryngoscope*, January, 1913) reports three cases of spontaneous reformation of ear drums that had been practically completely destroyed. In each case the duration of time between the beginning of the suppuration and the beginning of the reparative process had been long—one forty, one twenty, and one seven years; but the reparative process, once begun, continued spontaneously until the drum had been completely replaced. The hearing in one case remained stationary, in one case it was increased, and in the last case it was markedly diminished. He concludes, from the study of these three cases, that perforations of the largest size, under favorable circumstances, close spontaneously and without adhesions, even years after the inception of the disease and the cessation of all discharge. That the tympanic cavity always has a tendency to heal, provided the exciting cause has been removed. That the reason for so many failures in restoring the continuity of the tympanic membranes is due to the lowered vitality of the tissues, and that by waiting before instituting active treatment to build up the general health of the individual and to improve the local condition, better results may possibly be obtained. The complete closure of a perforation is of a doubtful advantage, because the hearing is usually decreased, although the danger of recurrence of the disease is much less. *Richards.*

Some Curable Affections of the Acoustic Nerve.

ALFRED LEWY (*Laryngoscope,* March, 1913, p. 190) believes that it is possible to recognize earlier the curable and noncurable forms of nerve deafness by ascertaining the cause through systematic and accurate functional tests. Besides the careful investigation of the etiology and the use of the tuning forks, observation may be necessary for a short time. Nerve degeneration is more apt to occur in men; in those who work in a continuous noise; in both sexes past the middle age; in young people as the result of one of the infectious diseases, meningitis, mumps, or hereditary syphilis; while in older people acquired syphilis and later arteriosclerosis are factors. The infectious diseases may cause nerve deafness without suppurative lesions, and for this reason should always be closely observed; and in many instances the patient comes to the observation of the otologist too late. The loss of hearing is usually severe, unequal in both ears, except when very advanced, and the loss of the upper tone limit, or of other areas of the scale, is marked. The use of quinin, alcohol, nicotin poison, chloroform, carbon monoxid, oil of chenopodium, mushroom, lead, mercury, phosphorus, silver, carbon dioxid, carbon disulphate, smoke, ergot, and morphin, all play an important part in the cause of nerve deafness. *Richards.*

Tinnitus Aurium.

EDMUND PRINCE FOWLER (*Laryngoscope,* March, 1913) has obtained some relief from cases of tinnitus by the application of a tight constricting neckband which gives relief by increasing the labyrinthine pressure or by the relief of the undertension in the middle ear, which is brought about by the congestion outbalancing the weighting effects of this congestion on the middle ear mechanism. In neurasthenic patients relief from the tinnitus comes after wearing the neckband for long periods of time, whereas in nonneurasthenics relief is afforded as long as the neckband and other appropriate treatment is continued. Tinnitus in otosclerosis is influenced sometimes by the increased labyrinthine pressure induced by the neckband, but rarely by the increased pressure in the external meatus. In nerve deafness a neckband will diminish tinnitus unless the determining factor of such tinnitus is extralabyrinthine, in which case it will but rarely lessen it. In chronic nonsuppurating otitis with tinnitus, if a constricting neckband increases the tinnitus, the determining factors are mainly in the middle ear, and are more or less influenced by treatment, according to the character of the lesions. If a constricting neckband diminishes the tinnitus, the determining factors are either in the labyrinth or its walls, and are due to reflex irritations or to general conditions, such as anemia, neurasthenia, with or without accompanying middle ear lesions. Prognosis in these cases is better than is first to be expected. If meatus closure and the constricting neckband have no effect on a marked tinnitus, the results are negative, and probably sclerotic conditions exist. If the neckband diminishes tinnitus, and increased air pressure in the external auditory canal has no effect, there is probably extreme ankylosis or otosclerosis.

Richards.

Relief of Auditory Disturbances.

Wells P. Eagleton (*Laryngoscope*, May, 1913) describes in detail three cases of deafness associated with intracranial tumors, where a slight direct pressure caused suspension of the function of the acoustic nerve at one of its two vulnerable points, enough to produce deafness, the relief of the pressure restoring the hearing. It is concluded from these intracranial lesions of the posterior fossa that there may occur early reduction of the excitability of the vestibular apparatus, not only of the affected, but of the unaffected side, and perhaps an oscillation of the function of the cochlear apparatus of the unaffected side; all possibly due to the edema of the nerve sheath, which condition may be revealed by repeated careful examinations by qualitative test, and are relieved, at least temporarily, by decompression. *Richards.*

Resonators, With Special Reference to the Schaefer Apparatus.

ROBERT SONNENSCHEIN (*Laryngoscope*, May, 1913) describes and calls attention to the use of the Schaefer resonators, which are adjustable to any tone between A^1 (108 v. d.) to a little above c^3 (1024 v. d.). These resonators can be used in physical research in the analysis of tones, in testing tuning forks to prove up the actual tone claimed to be present, to determine the pitch of unmarked forks, and for testing the absolute duration of hearing. With one of these resonators inserted in the ear, a tuning fork, no longer heard alone, will be appreciated, but when its sound ceases to be heard even with reinforcement, it is known that the limit of hearing is reached. To determine absolute deafness, forks not heard at all alone can be used with the resonator to establish a correct diagnosis. *Richards.*

Obliteration of the Mastoid Cavity.

SAMUEL IGLAUER (*Laryngoscope*, May, 1913) describes his method of closing a mastoid wound by means of a flap taken from the temporal muscle, which greatly reduces the time of the after-treatment and gives an excellent cosmetic result. After performing a simple mastoid operation in which the mastoid cavity is thoroughly excavated, the original mastoid incision is prolonged upward and forward into the hairy scalp. The incision, concaved and about one and one-half inches long, lies immediately anterior to the posterior border of the temporal muscles. The scalp is dissected downward and forward, exposing the temporal fascia, and the posterior portion of the temporal muscle and fascia are freed from the pericranium; a triangular flap, with the apex downward, is then formed by splitting off the exposed muscle in the line of its fibers, the pedicle being formed of the fiber passing under the zygomatic arch, and contains branches of the temporal arteries. The flap is rotated downward and backward into the mastoid cavity. If the temporal ridge is prominent, it is chiseled away with the underlying bone, to provide a groove for the pedicle; and if the pedicle is too short or thick, it is lengthened by cutting obliquely across some of its anterior fibers. The flap is fastened to the periosteum by catgut sutures at the lower angle of the incision. A rubber drainage tube is inserted from the antrum to the lower angle of the incision. A puncture is then made through the scalp over the dead space left by the removal of the muscle flap and a gauze wick is inserted at this point. Sutures are made in the scalp incision, the upper ones being tied and the lower ones untied to allow for drainage, but these lower ones are drawn taut on the first or second day after the operation. The mastoid incision is closed by interrupted sutures. Layers of gauze are placed over the dead space and a very firm bandage is applied. This operation is readily done and assures proper drainage.

Richards.

Ear Labyrinth Inflammation.

HENNINGER (*Laryngoscope,* July, 1913), from a review of the literature of acute labyrinthitis, finds it to be either serous or purulent, and due to an invasion of the labyrinth by either toxins or pathogenic germs. It may be either diffuse or circumscribed, and arises as a complication in acute or chronic suppuration of the middle ear and mastoid, and also during the course of severe infections, as diphtheria and scarlatina. In serous labyrinthitis the onset may be either sudden or gradual; temperature normal or slightly elevated; pulse usually rapid. Tinnitus, dizziness, nausea, and disturbance of equilibrium is often complained of. The hearing is reduced, but the vestibular apparatus responds to stimulation. Spontaneous nystagmus is present and is directed toward the diseased side. These conditions indicate the early stages with gradual onset. Cases of sudden onset present conditions difficult to differentiate from the purulent type.

Purulent labyrinthitis produces nausea and vomiting, fever, headache, tinnitus (early), deafness later, nystagmus, loss of labyrinthine irritability, and vertigo. The onset is sudden, with a distinct rise in temperature, often accompanied by facial paralysis. At first the nystagmus is to the diseased side, but later in the progress of the disease the end organs of the vestibular nerve lose their function, and the nystagmus is to the sound side. This is often known as increased irritability of the sound labyrinth. The vertigo and disturbance of equilibrium continues for several days, and the patient is unable to assume the erect position, lies on the side towards which the nystagmus is directed, and so has less subjective sensations from the nystagmus. All efforts to stimulate the vestibular apparatus are futile, and by applying the Neumann noise apparatus to the sound ear, the diseased ear is incapable of detecting the most penetrating sound. A complication arising from purulent labyrinthitis may be meningitis, or a cerebral or cerebellar abscess; the latter is the most frequent complication. Acute purulent labyrinthitis must be differentiated from cerebellar abscess, as nystagmus plays an important part in both conditions. Nystagmus towards the affected side may be due to a beginning circumscribed labyrinthitis or a cerebellar abscess. A cerebellar abscess cannot be excluded prior to an operation on the labyrinth. After a conjoint radical mastoid operation and labyrinth operation, if the rotatory nystagmus is directed toward the diseased side, a diagnosis of cerebellar abscess can be made.

Cases of serous labyrinthitis call for a mastoid operation, simple or radical, after which the patient is carefully observed. Cases with labyrinthine complications following acute mastoiditis or an acute exacerbation of a chronic process are put to bed for absolute rest after the removal of the primary foci. Circumscribed labyrinthitis is treated expectantly. *Richards.*

The Diagnosis of Rupture Into the Lateral Ventricle and of Acute Internal Meningitis.

Erich Ruttin (*Laryngoscope,* August, 1913) reports three cases of brain abscess in which the postmortem examinations revealed a rupture of the abscess into the right lateral ventricle, causing pyocephalus internus. In these cases there was a sudden onset of vertical nystagmus, a valuable symptom of acute pyocephalus, and the most frequent form of meningitis after a temporal lobe abscess. In a case of temporal lobe abscess showing vertical nystagmus, even after opening the abscess there may be rupture into the ventricle or infection of the ventricle through a thin partition. *Richards.*

Technic of Labyrinth Operation.

Edward B. Dench (*Laryngoscope,* August, 1913) believes a labyrinth operation in the future will be an explorative procedure in certain cases of impairment of hearing, progressive in type and involving the labyrinth. He describes an ideal operation performed upon the cadaver in nonsuppurative labyrinthine lesions. This type of operation has many possibilities, in that it can be performed without a preliminary radical operation, it destroys the contents of the horizontal canal, the superior canal and the vestibule. It is performed through the ordinary mastoid operative field, providing the operation included the zygomatic cells, without taking down the posterior wall of the external auditory canal. If the cochlea is to be opened, it is necessary to perform a complete radical operation to obtain a perfect view of the promontory and to enable the operator to remove the bony wall of the first and a portion of the second turns of the cochlea by taking down the bony ridge of bone which separates the oval and round windows. Such interference with the cochlea would not be necessary in cases suffering from vertiginous symptoms.

Richards.

Decompressive Operations in Intracranial Complications of Otitic Origin.

William Milligan (*Brit. Med. Jour.*, August, 1912, p. 427). Decompressive operations for the relief of meningitis have been used by Milligan in twelve cases. Four of the twelve cases were undertaken when the patient was in extremis, and all were fatal. Of the remaining eight cases, five died and three recovered, the percentage of recoveries being only a little over 26 per cent.

The pressure within the skull cap at once crowds the brain through the opening made, and this undoubtedly interferes with the much desired drainage. By slipping strands of gauze or pieces of rubber tissue between the dura and the brain, a very fair system of drainage may be secured and maintained.

Richards.

The Technic and After-Treatment of the Radical Mastoid Operation.

William Milligan (*Brit. Med. Jour.*, September, 1913), by comparing the various methods of after-treatment of the radical mastoid operation by packing, alcohol drops, antiseptic powders, cell proliferants, skin grafting, and the use of blood clots, finds the best success by the use of blood clot dressing, healing resulting in the shortest time, on an average of 6.2 weeks, in twenty cases. Second in preference is the application to the granulating surface of one or other of the cell proliferants, namely, scarlet red, amidoazotoluol, pellidol, azodolen, and allantrin. He advocates the closure of the eustachian tube at its nasopharyngeal end, because closure at its tympanic orifice is dangerous, on account of the uncertain proximity of the internal carotid artery; because curettement, if the tube was to have a chance to cicatrize, destroys the mucous glands of the part whose presence is essential to retain for good results; and lastly the permanent closure of its tympanic orifice is a failure. The mucosa of the inner tympanic wall should be retained, if not too degenerated, in order to secure the greatest amount of postoperative hearing power.

Richards.

Ocular Imbalance and Auditory Affections.

S. Alison Bradburne (*Brit. Med. Jour.*, October, 1912) finds that the examination of affected cases of disease of the labyrinth shows a majority of them causing an ocular disturbance in the maintenance of parallelism of the vertical meridians. That when disease tends to invade the deeper parts in the neighborhood of the auditory organ, an ocular imbalance follows, which is manifest in a difference in the elevation of the eyes. *Richards.*

Aural Vertigo, Nonsuppurative.

Richard Lake (*Lancet*, December, 1912, p. 1638) divides aural vertigo into three classes, and reaches the conclusion that chronic middle ear deafness and arteriosclerosis are the most frequent causes of aural vertigo. He finds a large amount of benefit can be derived from the use of drugs, but by no means are all cases capable of this relief. He places rather small reliance upon the rotary and caloric reactions. One is able to make one's diagnosis and prognosis in the class of cases under consideration equally as well without their employment. In twenty cases of labyrinthine vertigo where there had been no perforation in the labyrinth, and fourteen of whom had had no previous suppuration, he found only twice fluid on opening the labyrinth. In these two cases there was a considerable amount of fluid, and one had also an extremely large semicircular canal, apparently four or five times greater than the normal size. Even now he is not prepared to say that these cases contained fluid under pressure. He thinks it rather difficult to consider from a purely mechanical point of view how fluid can be retained in such a nonvascular bony cavity. In the way of medicines, he has found cases of labyrinthine hemorrhage to be absolutely beyond our reach. In labyrinthine cases pilocarpin should be tried, increasing the dose as rapidly as is consistent with safety, and continuing it for about two weeks. In arteriosclerotic cases he confines himself to the use of hydrobromic acid, with a small dose of quinin or iodid of potassium. In the socalled Ménière's disease cases he uses small doses of quinin with hydrobromic acid. *Richards.*

Sporadic Congenital Deafness, and Deafness From Syphilis.

JOHN KERR LOVE (*Glasgow Med. Jour.*, February, 1913), after an extensive study of syphilis and its relation to deafness in children, draws the following conclusions:

1. Syphilis is an infectious disease, which, having entered the blood of the parents, is transmitted to the children.

2. It stunts, and dwarfs, and kills children. Many of them are stillborn, many die within a few months or during the first year, and of those who survive some become blind, some deaf, some both blind and deaf, while some continue in apparently good health.

3. The Wassermann reaction or test nearly always gives a positive result when the combination of keratitis (blindness) and deafness occurs in the child of syphilitic parents. Occasionally the result is negative in the presence of the combination. It sometimes gives a positive result in the apparently healthy brothers and sisters of those affected by blindness or deafness, thus showing that they are really infected, and that at a later date symptoms may develop.

4. A common cause of death among these syphilitic children is meningitis. It is the commonest cause of their death, and this disease occurs most commonly during the first or second years.

5. Untreated or insufficiently treated syphilis in the parent may be discovered by the Wassermann reaction many years after infection. Healthy and diseased children may be born at any stage of the family history, but the usual family record is that the earliest children are stillborn, then diseased children, and, lastly, healthy children. The later children have the best chance to live.

These conclusions were based on the examination of the blood of one hundred and fifty persons, about half of whom were born deaf, and a third of whom have become deaf since birth. The remaining cases were not deaf at all, but were related to others in the list who are deaf.

In some families the cells which form their make up are so deficient in those determiners or factors which go to the complete make up of a perfect nervous system, that the children born into such families are feeble minded or epileptic, or are born deaf. These defects may be accentuated by such poisons as alcohol and syphilis. Within the family stream the defect is permanent, and is developed to its utmost by the intermingling of similar cells or by the marriage of those who are related by blood. The defect may become less frequent by streams or families uniting, one of which is perfect or in whom the defect does not exist. But the defect cannot be stamped out so long as the family goes on at all, and the practical question is whether the defect is so serious for the individual and for the community that the latter should take steps to protect itself. *Richards.*

The Question of Curing Otitic Meningitis.

R. Kotz (*Munch. med. Woch.*, December, 1912, p. 2863) reports as healed three cases of otitic meningitis. Careful study of the cases would seem to place them under the class of labyrinthine trouble with certain meningitic symptoms, rather than direct cases of meningitis. They are also not checked up by any of the newer methods of diagnosis, such as the chemical test suggested by Dr. Kopetzky. *Richards.*

Otitis Externa Furunculosa.

A. Zograffdes (*Wien. klin. Woch.*, December, 1912) disinfects the external canal as well as the pinna, and then makes from three to five cuts in the point where he has previously determined with the probe the greatest pain to be located, and then applies a sterile strip of gauze moistened in 10 per cent carbolic acid solution. He anesthetizes the place with cocain. The pain lasts from one to two hours, but has completely disappeared in five to six hours after the time of incision.

Richards.

Syphilitic Infections of the Middle Ear.

Carl Luders, Wiesbaden (*Deut. med. Woch.*, January, 1913, p. 225). The external ear, middle ear and labyrinth are liable to syphilitic infections as well as other parts of the body. Middle ear infections of syphilitic origin, like those of tuberculosis, do not show any specific character. The principal symptom is a more or less sudden and increasing loss of hearing, sometimes accompanied by dizziness. The author reports five cases in which the ear phenomena occurred, as follows:

In one case, two years after initial infection.
In two cases, five years after initial infection.
In one case, six years after initial infection.

In one case the disease was hereditary. Facial paralysis on the same side as the affected ear supervened in one case; in one case, fever, nausea, vomiting, dizziness and nystagmus were present. The author believes that in all of his cases the disease manifested itself in the form of a gumma of the middle ear.

Treatment, consisting of paracentesis, when indicated, plus vigorous antisyphilitic measures, proved effective in nearly all cases. In one case, neosalvarsan was employed; 0.4 gram was injected six times at ten to twelve day intervals, with good results. In nasal and nasopharyngeal conditions the author has usually had equally good results with mercury and potassium iodid as with salvarsan. Iodid potassium is particularly useful. *Richards.*

New Method of Direct Dilatation of the Eustachian Tube.

A. V. GYERGYAI (*Deut. med. Woch.*, June, 1913) has devised a metal dilator with which to stretch the pharyngeal end of the eustachian tube. It is introduced through the pharyngeal speculum of the straight type, either that of the author or of Yankauer. The results in a series of cases already treated by usual methods without satisfactory results was very gratifying, marked improvement in hearing taking place. The method is offered as an addition and not as a substitute for other methods. The dilator is moulded to the shape of the membranous eustachian tube as determined by experiments on the cadaver. *Richards.*

Prognosis and Treatment of Tinnitus.

WITTMAACK (*Deut. med. Woch.*, September, 1912) finds one of the most troublesome complications of which patients complain is subjective noises or tinnitus. He advises that before treatment is undertaken for these noises a careful search for the underlying cause be made. Quite a few are circulatory in character, and in many cases directly transmitted, as from aneurism, increased blood pressure, pyemia, anemia, and cardiac diseases. The treatment should be directed to the cause only.

There is another class in which the noises are of a nervous type, and in these cases the patient is best treated by having in his room some clock or watch which by very loud ticking will take away the annoyance of the tinnitus. The device which produces a sound nearest to the sound of which the patient complains is the best. The patient should sleep in the noisiest room in the house, and after a time becomes impervious to the aural noises.

The group of cases in which the noises are dependent upon changes in the sound apparatus itself are of two classes: those depending upon pressure in the external canals, as from cerumen, and in the causation of which all the acute and chronic affections of the middle ear may be concerned. Noises which are dependent upon diseased processes in the internal ear may be caused by the degeneration of the sound perceiving apparatus itself and the nerves directly therein concerned. These noises vary greatly in character. The treatment of these two classes of noises must have for its basis the original cause, so far as can be determined. Various medicines, such as quinin and salicylic acid, may produce ear noises. The prolonged use of alcohol and nicotin and organic nerve affections such as tabes and paralysis, and such constitutional diseases as nephritis, diabetes, pernicious anemia, leukemia, cachexia, and the like, may be the cause.

The remedies which lessen the sensitiveness of the nerve apparatus are the bromids and valerians. When no specific cause can be determined, it may be of advanatge to use iodin, pilocarpin, arsenic, or thyroid preparations. The best hydrotherapeutic methods are bathing the feet in hot water and the Sitz baths. Reactive hyperemia may be produced by massage, bougieing, electrolysis, hot air applications, the electric current and the like. It is only after a careful consideration of all the factors in the cases that the noises can be satisfactorily treated, and then in many instances the results are far from satisfactory and the question of complete destruction of the labyrinth may have to be considered, provided that noises are of sufficient annoyance to the patient. *Richards.*

Hallucinations of Hearing and Diseases of the Ear.

John H. W. Rhein (*New York Medical Journal,* June 14, 1913) reports three cases, all women, one over fifty and two over sixty, where in connection with vertigo and tinnitus there was a complaint of hearing voices. The aural condition of two of the cases was examined and shown to be only a catarrhal involvement of the middle ear.

Rhein feels that the possibility of arterial changes in the brain must be recognized in all three cases, and that the nutrition of the auditory centers has been more or less implicated.

He concludes that "while the occurrence of hallucinations of hearing associated with disturbances of the peripheral auditory apparatus does not necessarily indicate the onset of insanity, there can be little doubt that this phenomenon is an expression of an unstable psychic equilibrium, and is therefore actually within the domain of psychiatry." *Harris.*

The Prevention of Deafness.

G. Hudson-Makuen (*New York Medical Journal,* August 16, 1913). In the consideration of this important subject the author refers to certain statistics recently compiled by the United States Board of the Census, which he summarizes as follows:

"Deaf persons having deaf relatives, however they are married, and hearing persons having deaf relatives and married to the deaf, are very liable to have deaf offspring. The proportion of marriages resulting in deaf offspring and the proportion of deaf children born therefrom being almost invariably highest where both of the parents had deaf relatives, and next where one of them had deaf relatives, and least where neither had deaf relatives. The marriage of the deaf most liable to result in deaf offspring are the consanguineous marriages. Out of thirty-one such marriages, fourteen, or 45 per cent, resulted in deaf offspring; and of the one hundred children born from these marriages, thirty, or 30 per cent, were deaf."

In the author's opinion, what is really inherited is not deafness, but physical anomalies which result in deafness. This view leads him to believe that even acquired deafness in adult life, socalled "catarrhal deafness," may be regarded as hereditary in so far as the particular physical and systemic conditions which cause it, such as rheumatism or gout, are hereditary or transmissible.

As remedies or means of preventing deafness acquired through heredity, he advocates, first of all, sterilization. He admits that we must still regard this as a radical measure, and therefore would have the bringing together of the deaf in large schools, a condition which has been accountable for the great increase in the marriage of the deaf in recent years, done away with, and in place of this recommends special day school instruction, where there will be less close association of the sexes. The prevention of acquired deafness is to be secured by preventing the development of the producing pathologic causes. Adenectomy, so generally practiced now, should be performed much earlier. Careful and thorough examination of the ears of young children is demanded, and an earlier treatment of the conditions found. Periodic examination of the ears, as is practiced in reference to the eyes, is also a desirable measure. Finally, all measures which will control the development or spread of syphilis, shown now to be a potent cause of deafness, are called for. *Harris.*

The Roentgen Ray in the Treatment of Otosclerosis.

ORTLOFF (*Archiv. für Ohrenheilkunde*, Vol. 90, p. 233). Jaulin and Schwartz have already experimented with the Roentgen ray in otosclerosis, but Ortloff has conducted a careful and independent investigation. This represents ten cases treated in Bloch's clinic in Freiburg, i. Br. The method of treatment is set forth in detail. Müller and Müller-Uri tubes were employed, water cooled, together with the radiometer of Labourad-Moure, and the quantimeter of Kienbock. The ray was applied on three successive days in one-third the normal dose, and then an interval of from two to three weeks allowed to elapse, when it was begun again. The results of the treatment are set forth in each case. These are as a whole unsatisfactory. Temporary improvement was noted in individual cases, but relapses took place. No marked effect was witnessed upon the tinnitus. *Harris.*

Heat in the Treatment of Diseases of the Ear.

MALJUTIN (*Archiv. für Ohrenheilkunde,* Vol. 90, p. 245), a number of years ago, advocated the employment of heated bog soil in the various diseases of the ear. In the time that has elapsed he has had no occasion to change his views, and again urges its employment in the following conditions:

First, in the different forms of the exudative otitis, in the stage in which, in spite of inflammation and massage, the serous or mucous exudate remains dammed up in the middle ear.

Second, in the socalled adhesive catarrh, where the formation of connective tissue has begun, which fills the middle ear and causes the walls to become stuck together.

Third, in the different diseases involving the joints of the bones of the ear of a rheumatic or gouty nature.

Fourth, in typical otosclerosis in the beginning stage, where the stapes is beginning to be ankylosed in the window, and we hope to be able to bring the ossifying process in the capsule to a standstill by meanus of the increased metabolism.

Fifth, the syphilitic affections of the sound receptive apparatus.

In the hands of one of his associates the results of this treatment have been most satisfactory. The hearing ability, not merely with the speaking voice, but for the musical tones, has been noticeably improved.

The technic is simple. The bog, heated to a temperature of from 35 to 50 degrees R., is spread upon a cloth of sufficient size to entirely cover the ear. This method has the disadvantage of losing its heat quickly. To remedy this, the author has devised a mechanical contrivance kept warm by electricity. Inasmuch as the bog soil cannot always be obtained, he has been lately substituting for it simply dry heat.

He does not give a full report of his results, but sets forth the history of nine cases recently under his care, which bear out his claim that he has been able to improve many cases by this method where others methods have failed. *Harris.*

A Contribution to the Subject of Streptococcus Mucosus, With a Report of Twenty-one Mastoid Complications Caused by the Streptococcus Mucosus.

Zeman (*Archiv. für Ohrenheilkunde*, Vol. 92, p. 1). A full report of the twenty-one cases with an analysis of each one is given. An extended consideration is devoted to the character of the complications and to the postoperative course of the disease with the outcome. Based on the study of these twenty-one cases, the author makes the following conclusions:

First, operations dependent upon the otitis of the streptococcus mucosus are relatively frequent. The course of the mucosus otitis is in about 50 per cent of the cases typical, i. e., a long prodromal stage with slight symptoms and characteristic drum appearance, a late development of the suppuration or a complete absence of the same.

Second, in most cases there is no fever and sudden development of complications. In other cases the mucosus suppuration presents the clinical picture of an influenza otitis, and in no particular differs from the ordinary otitis.

Third, the mucosus suppurations very frequently lead to mastoid and endocranial operations. The pathologic and anatomic condition of the mucosus mastoid is typical, i. e., many scattered areas, later merging, separated by more or less healthy bone substance. Very often the inflammatory region is located primarily in the mucous membrane and the cells of the mastoid process.

Fourth, of the endocranial complications the perisinus abscess is most frequently observed in more than half the cases.

Fifth, the tendency of the mastoid ostitis is very slight towards a perforation of the cortex externally, which more often breaks into the cranial cavity.

Sixth, as regards treatment, an accurate extended observation of patients during the prodromal symptoms is necessary.

Seventh, a bacteriologic examination of the pus from the mastoid is important. When the streptococcus mucosus is found, a careful examination is necessary in order to correctly recognize peculiarities of this organism.

Eighth, every elevation of temperature after the operation, excluding other causes, points to the existence of an area of suppuration somewhere, and indicates a further operation.

Ninth, on this account the primary suture of the postauricular wound is contraindicated.

The duration of healing is very long, and averages sixty-two days. The prognosis is favorable when it is possible at an early date to eliminate altogether the foci of suppuration.

Harris.

The Absolute Indication for Operation Upon the Labyrinth.

LEIDLER (*Archiv. für Ohrenheilkunde,* Vol. 93, p. 73). This contribution from the pen of Professor Alexander's first assistant in the Vienna policlinic is especially welcome at the present time, representing as it does the results of the Alexander clinic in the treatment of labyrinthine diseases.

Leidler's conclusions are based upon a study of twenty-seven cases operated upon by Alexander or himself. These are as follows:

1. Every diseased labyrinth dependent upon a purulent otitis, whether acute or chronic, combined with a labyrinthogenous intracranial complication, must at once be operated upon. Of these complications, the lightest degree is represented by a persistent headache on the side of the affected ear.

2. Every labyrinth which shows involvement as the result of an acute or chronic otitis, with symptoms of acute diffuse labyrinth suppuration, advanced nystagmus of the third degree toward the healthy side, and lack of response to the turning test, must at once be operated upon, in case the temperature is more than 38°, or the symptoms do not improve within four days.

3. A labyrinth which, as the result of an acute or chronic otitis, is completely destroyed functionally, and does not comply with the conditions set forth in paragraphs one and two, must at once be operated upon, in connection with the radical opening of the antrum, in case a spot in the bony capsule shows a pathologic opening into the peri- or endolymphatic space (fistula, cholesteatoma, sequestrum, tumor, etc.), or where there are persistent symptoms of irritation of the labyrinth, dizziness, nystagmus, vomiting.

The three indications for operation are based entirely upon clinical experience, and have no relation to the pathologic and anatomic questions, especially that of the differential diagnosis of acute or purulent diseases of the labyrinth. This latter question is met in the second indication, where Leidler states that a general diffuse labyrinthitis must be at once operated upon if the temperature rises above 38°, or the symptoms persist in the same degree for more than four days. It is his experience that a serous labyrinthitis never shows a higher temperature than 38°, nor symptoms which do not begin to abate in their intensity within four days. The observations cover a period of six years, from October, 1907, to July, 1913. There follows a full clinical report of the twenty-seven cases.

In most of the cases a typical labyrinthine operation was performed. That is, after a radical operation, the dura in the middle and posterior foci was freely opened and the labyrinth cleaned out, and the two points thrown together by the removal of the upper edge of the pyramid. The dura is then carefully mobilized and the labyrinth is removed to the extent of the diesased bone. In all the twenty-seven cases the labyrinthine disease depended upon a chronic otitis. In fifteen cases cholesteatoma was present.

Analyzing the results according to the three groups of indications, to group one belong thirteen cases (cases 1 to 13), and to the third group twelve cases (cases 16 to 27).

There were, then, of the twenty-seven cases, fifteen (groups one and two) complicated by intracranial disease. These represent, first, labyrinthogenous circumscribed purulent meningitis (4), second, labyrinthogenous diffuse purulent meningitis (7), third, serous meningitis (3), and fourth, cerebellar abscess (1).

In sixteen cases there was a fistula, for the most part in the horizontal canal. In five cases there was a more or less extended sequestrum of the labyrinth. Ten of the cases were acute, six subacute, nine chronic, that is, a latent diffuse purulent labyrinthitis. Of the twenty-seven cases, nineteen were cured, eight died, a percentage of 29.6 per cent of deaths and 70.4 cures. In estimating the prognosis, cases 11 and 12 are to be excluded, where meningitis had already developed. The twenty-five others, then, represent 24 per cent of fatalities and 76 per cent of cures. *Harris.*

Reeducation of the Deaf—A Restatement of the Method of Treating Progressive Deafness by Means of a Special Instrument Devised for This Purpose.

MAURICE (*Archives Internationales de Laryngologie, d'Otologie et de Rhinologie*, September-October, 1913). The author does not pretend to cure the cause of the trouble. He insists that both deafness and its cure is a relative term, and does not claim to restore hearing when total deafness exists. Reeducation is not the only treatment employed by him. The other methods are to be employed as usual. The principle involved is the same as the cultivation of the sense of touch in the blind, or of the eyes in those who use the microscope. Urbantschitsch was the first to make use of the principle involved. The simplest application of the principle is that of shouting in the ear of the deaf. The range required, more than five octaves, makes it impossible to employ the human voice. Successful reeducation requires that the ear of the deaf person should be struck by a sound wave of a given intensity. This must be regulated for each ear. Finally, the sound should be sufficiently amplified to produce a pronounced massage.

Study of the different instruments previously devised has led to the employment of an electric apparatus which produces all vibrations from 100 to 4000 a second, a sufficient range for the education of all deaf persons. Maurice has given the name of the kinesiphone to his instrument. The kinesiphone produces in a word the disassociated elements of the human voice, amplifying them, regulating them, and varying them according to the particular case. It has a fivefold action upon the ear of the deaf. First, by mobilizing in a physiologic manner the organs of hearing, namely, the drum membrane and the ossicles; second, by stimulating the auditory receptivity of the deaf; third, by exciting the labyrinth, in which the nerve fibers commence to become sclerosed, atrophied and paralyzed; fourth, the sonorous massage produces a vasodilatation of which the trophic effect is decidedly marked, and there is a reappearance of cerumen and amelioration of the dry eczema of the auditory canal; fifth, the vibration of the kinesiphone favors contact of the cylindrical terminal ends and ciliated cells of the organ of Corti. A detailed account of the cases will be published in a short time.

The benefit to the hearing in a partially deaf person is permanent. When the patient is very deaf it is recommended, after the improvement has been obtained, that he continue to massage the ear by means of an ear trumpet with a double receptacle. Five minutes a day will be sufficient. The length of the treatment will depend upon the duration of the lesion, the age of the patient, and the cause of the deafness.

Harris.

Otosclerosis.

Citelli (*Archives Internationales de Laryngologie, d'Otologie et de Rhinologie*, November-December, 1913). The uric acid toxemia of a gouty or diabetic nature is, according to the author, an important cause of otosclerosis. This uricemia is wont to give rise to an ankylosis which in otosclerosis involves the articulation of the oval window. The author agrees with Denker in his recent view that the hypophysis is an important cause. The weighty role in bone development of certain glands with internal secretion is well known. Alteration in the secretion of one of these disturbs the dynamic equilibrium. Autointoxication is in the author's opinion another frequent cause of otosclerosis, proceeding, as it will, from a disturbed metabolism, the result of a perverted gland secretion. Of the glands of this system, the hypophysis is the most concerned with the disease of the throat and ear. The relation between otosclerosis and adenoids has been long recognized. The effect of adenoids in producing disease of the middle ear is well known. Based upon his previous demonstrations of the many intimate physiopathologic relations existing between adenoids and the pharyngeal pituitary body and those which are often found between adenoids and the central hypophysis, he believes that a far greater importance should be attached to the hypophysis system than to any other gland of the internal secretions in the etiology of otosclerosis.

With these preliminary observations he draws the following conclusions: That the disease consists essentially in a vascular osteoporosis of the labyrinthine capsule which can be caused very often by different general diseases. Among these he mentions, first, disease of the different endocranial glands, with probably a predominance of the cells of the hypophysis system; second, the different dyscrasias of uricemic origin—of these some have an etiologic and pathologic relation with the endocranial system; third, syphilis; fourth, osteomalacia and rickets; fifth, tuberculosis, etc. As regards the pathologic condition present, he believes that these should be divided into three groups. The first includes those cases in which the spongifying process has produced only an ankylosis of the stapes. Here the characteristic Bezold triad is found. Second, cases in which there is a bony fixation of the stapes and other foci of the spongifying process in the labyrinth capsule, associated with an atrophy of the labyrinthine membrane (corresponding to our socalled "mixed cases"). Third or intermediary group of cases in which there are multiple and dissimilar foci of spongification without there being any ankylosis of the stapes, and in which there also exists symptoms of atrophy and degeneration of the labyrinthine membrane, especially of the cochlea. Because of these wide differences in symptoms, Citelli believes that instead of speaking of otosclerosis as a disease, it should be called a syndrome, and would substitute for the term "otosclerosis" that of "otosclerotic syndrome," or, better still, that of "otospongifying syndrome." He states, in conclusion, as regards the treatment, that the employment of the extract of hypophysis in tablet form has been a benefit in certain cases, especially as regards the relief of the tinnitus. *Harris.*

Labyrinth Operations for Severe Labyrinthine Vertigo.

MATTE (*Archiv. für Ohrenheilkunde*, 1912). The author's conclusions, based on five labyrinth operations, are as follows: Vertigo, caused by labyrinth disturbances alone, may be greatly relieved, or, as in one of his reported cases, completely cured, by operation. He believes that in the cases in which subjective noises still exist after the operation, they are caused by degeneration of nerves, particularly of the acusticus root. They are the extralabyrinthine noises, and are not dependent on the old idea of labyrinth pressure. The author's indications for opening the nonsuppurating labyrinth are unindurable subjective noises and extreme vertigo. *Theisen.*

The Diagnosis and Treatment of Brain Abscess.

F. HENKE (*Archiv. für Ohrenheilkunde*, 1912). The author's investigations were largely based on cases observed during the past ten years in the clinic of Prof. Gerber, in Königsberg. Among the cases were nine brain abscesses of otitic origin, of which eight were operated upon. Five of these were in the cerebrum and three in the cerebellum. Three of the five operated cases died, two being complicatd by sinus phlebitis, and one with meningitis. Two of the uncomplicated cases recovered.

Of the three cases of abscess in the cerebellum operated upon, one case, also complicated with sinus phlebitis, recovered; two died as a result of pyemia, and one, reported fully in this article, of respiratory paralysis. One of the most important points in the diagnosis of cerebellar abscesses is the symptom described some years ago by Babinski. In abscesses in this region of the brain, patients are not able to make certain antagonistic movements pro- and supination, quickly and frequently repeated.

In considering the treatment, the author states that it is of great importance, even after the abscess has been evacuated, to pay close attention to the brain pressure. Lumbar puncture, if necessary, frequently repeated, will tend to greatly diminish the danger of an increase of the brain pressure. In cerebellar abscesses, also, this procedure may save the life of the patient, even after drainage has been established.

Theisen.

Further Examinations and Experiences in Regard to the Relations Between the Vestibular Apparatus and the Central Nervous System.

BÁRÁNY (*Wiener medicinische Wochenschrift,* Nos. 49 and 50, 1912), as the result of his investigations, comprising twenty-two autopsies, as well as five clinical cases, also acusticus tumors with extracerebellar locations, comes to the following conclusions: Tumors, in any location, can produce cerebellar symptoms, both on the same side and on the opposite side.

In order to distinguish "Herd" symptoms from surrounding conditions, it is necessary to make an exact examination of the spontaneous developments as well as thorough functional tests; for example, when spontaneous falling occurs, it does not necessarily mean that this points to a "Herd" symptom. It is important to examine a case not once, but many times. If the symptoms change, so that at times there is no falling, and no movement of the arm from one side to the other, a remote influence is fairly certain. If only a portion of the symptoms change, then there is probably a combination of "Herd" and surrounding disturbance. A passing nystagmus of varying itensity, or a permanent uniform severe nystagmus of intracranial character, is present in tumors of every localization. Severe disturbances of hearing, in cases of tumors outside of the posterior cranial fossa, occur rarely. Slight disturbances of hearing, similar to a lesion of the internal ear, are much more common. A one sided or double total deafness occurs perhaps only with acusticus tumors.

Ruttin has reported a case of deafness on one side with a tumor of the temporal lobe. Frey, Claus and Bárány have reported cases in which the hearing was not disturbed in acusticus tumors. Tinnitus is not complained of much in cases of brain tumor. Severe attacks of vertigo are usually present in the beginning of tumors of any localization; later in the course of the disease spontaneous vertigo is usually absent. The author has rarely found the caloric reaction absent, except in cases of acusticus tumors. Most of the cases of brain tumor, in which a considerable pressure on the posterior cranial fossa exists, are almost entirely insensitive to vestibular irritation. Spontaneous vomiting occurs usually only in the beginning.

In most of the cases of decided pressure symptoms in the posterior cranial fossa, an increase of the vestibular reactions, both nystagmus (first described by Ruttin), as well as falling movements, can be determined. If pressure symptoms are absent, the irritability of the entire vestibular apparatus may be very slight. Even in tumors of the posterior cranial fossa this may be so. An increase of vestibular irritability is not important in diagnosing the seat of the tumor. No conclusions can be drawn from a single symptom. The entire neurologic picture and the course of the disease must be taken into account in making a diagnosis.

In conclusion, the author states that it is important for neurologists to make use of the newer methods of examination. *Theisen.*

Concerning the Cause of Permanent Opening and Cicatrization of Perforations of the Tympanic Membrane in Childhood.

GOMPERZ (*Wiener medicinische Wochenschrift*, No. 3, 1913). Perforations that will not heal are most frequent after the otitis of scarlet fever. Hereditary taints, particularly tuberculosis, are influential in causing a predisposition to this condition. The early treatment of a suppurative otitis, particularly a prompt incision, frequently prevents the development of larger defects. To bring about the healing of old perforations, the writer recommends the use of trichloracetic acid. *Theisen.*

II.—NOSE.

Supraturbinal Opening in Chronic Maxillary Sinusitis.

Kubo (*Archiv. für Laryngologie,* Bd. 26) has adopted the method first described by Siebenmann, of enlarging the natural opening of the antrum, as he considers it to offer the advantage of not readily closing, and of offering easier access, both for the operator and for the patient, in subsequent irrigation. A cutting instrument is employed similar to a Hartmann's conchotome and Killian's double curette. This is introduced into the region between the uncinate process and the accessory maxillary ostium. A sufficient amount of the margin is removed to produce a diameter of the opening of one-half centimeter. After the operation hydrogen peroxid is applied to check the bleeding, and the daily irrigation is performed through the opening. In some cases it is necessary to remove the uncinate process. *Goodale.*

Pathogenesis of Lupus of the Interior of the Nose in Its Relation to the Vicinity.

Albanus (*Archiv. für Laryngologie,* Bd. 27, Heft 2). The manner in which lupus may arise in the nose may be:

1. Hemotogenous.
2. Erogenous, or through contact. In both cases either as the first focus in the nose (primary nasal lupus), or by the existence of old foci (secondary nasal lupus).
3. As a primary infection in the nasal vestibule, particularly in the nasal recess, or as a transition of a scrofulous eczema of the nasal vestibule into lupus.
4. Lymphogenous. As the first visible lupus of the body in the nose, although actually a lymph gland had been previously infected, or as secondary nasal lupus, resulting from the extension of neighboring lupus to the interior of the nose by the lymph channels.
5. By continuity. Nasal lupus extends further into the neighborhood (primary nasal lupus), and its relation to the vicinity, or lupus extends from the vicinity into the nose (secondary nasal lupus).
6. Nasal lupus as the result of tuberculosis of the bones.
7. Extension towards the cranial cavity.

The relative frequency of these conditions is illustrated by a review of the statistics and by the author's experience. *Goodale.*

On the Operative Treatment of Collapse of the Alæ Nasi.

DAMM (*Archiv. für Laryngologie*, Bd. 27, Heft 2). By the author's method, a flap of mucous membrane from the septum, about six millimeters high and three millimeters broad, is cut out in such a fashion as to embrace the point of departure of the constricting band and extend about one and a half millimeters above it. The constricting band is then incised with a small knife completely through, in a posterior direction, so that the point of the knife lies free in the nasal passage. The fold is now cut flatwise through as far as the septum in such a fashion that the cut strikes exactly the upper end of the septal flap. By the union of both cuts, the flap hanging at the point of incision in the ala is entirely separated from the septum, and hangs free in the lumen of the nasal passage. The flap is now placed upwards in such a manner that the free end of the septal flap lies at the angle where the septum and the ala meet, leaving the defect of the septum uncovered. By firm tamponing the ala is stretched and the septal flap firmly approximated. The ala is then kept in its elevated position for at least two or three weeks. *Goodale.*

On Polyps of the Sphenoid Sinus.

KUBO (*Archiv. für Laryngologie*, Bd. 27, Heft 2). Polyps may arise from the orifices of the sphenoidal sinus, especially from the lowest portion. In the early stage of their development these polyps remain in the interior of the sinus and are found by chance on opening the cavity. They may also be recognized by a round polypoid prominence at the upper margin of the choanæ, immediately below the ostium. This appearance is an important objective sign of chronic sphenoidal sinusitis. In the later stage of their development they may become so large as to occlude the choana. Their differential diagnosis from polypi of the antrum is, therefore, very important from the therapeutic point of view. Since such polypi on account of their short pedicle resemble closely fibromata of the nasopharynx, careful examination must be made before operation. Most of the socalled choanal polypi are in reality sphenoidal polypi. In these cases the ostium of the sphenoidal sinus is usually large. Simple removal with the snare does not effect a radical cure. The sphenoidal sinus itself must be opened and treated. *Goodale.*

The Successful Treatment of Atrophic Rhinitis and Ozena—A New Remedy.

Louis Jacobs (*New York Medical Journal*, May 31, 1913) had in twenty cases employed scarlet red in the form of a suspension in the mucilage of acacia, of 5 per cent. His results have been uniformly good. In a short time the mucous membrane begins to undergo regenerative changes. The odor disappears, the crusts soften and diminish in amount. The nose is first thoroughly cleansed before the suspension is applied. The suspension remains adherent for about two days. In addition to the local condition, the general condition of the patient improves. The report of six cases is appended. He claims for the treatment lasting results, and states that it is simple and of short duration. *Harris.*

Antral Empyema, With the Presentation of an Efficient Conservative Operation for Its Cure.

H. C. Masland (*New York Medical Journal*, July 26, 1913). Masland's operation consists in the introduction of a curved cannula through the floor of the nose into the antrum, and allowing it to stay in situ for an indefinite period. The antrum is opened with a straight trochar, having a drill shaped point. The cannula employed has a collar at its inner end and one beyond the curve. A small silk loop attached to the nozzle enlargement allows the patient to steady the cannula and introduce a syringe tip for the purpose of irrigation. The case is seen from time to time. A month's time usually suffices to effect a cure, even in very severe cases. *Harris.*

The Uses and Limitations of Paraffin in the Treatment of Ozena.

Julius Auerbach (*New York Medical Journal*, September 20, 1913) has made a study of thirty-two cases of genuine ozena treated by the injection of paraffin. After considering the dangers connected with the operation, and describing his technic, he makes the following conclusions:

1. In the injection of hard paraffin of high melting point the danger of embolism is eliminated.

2. The results so far obtained, even in severe cases, afford encouragement for the further use of paraffin injections in ozena.

3. It is impossible to speak of a "cure," even in those cases which show a disappearance of the disagreeable symptoms.

4. There is no influence anatomically on the atrophied structures.

5. Functionally the results are all that can be desired, though all cases eventually require reinjection. *Harris.*

A New Method of Opening the Antrum of Highmore.

LEVINSTEIN (*Berlin. Zeit. f. Laryngologie, etc.*, Bd. 6, H. 3, p. 419), after carefully reviewing the various intranasal procedures, gives his method, which although not new in all details, he considers as overcoming the objections of all the other procedures. After local anesthesia with 20 per cent cocain and injection of 1 per cent novocain under the nasal wall of the antrum, he makes an incision with a Freer septum knife, cutting through the mucous membrane along the pyriform border and parallel to the anterior border of the inferior turbinate, until it reaches the middle of the floor of the nose. The mucous membrane and periosteum are now raised up as far back as the middle of the inferior turbinate and this dissection carried carefully down on the floor of the nose. With a pair of narrow scissors the mucous membrane is cut through as near the insertion of the inferior turbinate as possible, and the flap pushed over against the septum. With any convenient instrument the nasal wall of the antrum is removed as far as the raised up membrane will allow. It is very important to remove the most anterior part of the nasal wall and carefully keep the floor of the nose and the antrum on one level. After as large an opening as possible has been removed without interfering with the insertion of the turbinate, the redundant mucous membrane is cut away, and under no consideration is a flap laid into the antrum itself. If an examination of the lining of the antrum shows that it will be necessary for a complete cure to curette the same, the ordinary radical operation is done through the canine fossa, and only then is it permissible to lay a flap into the antrum.

Horn.

III.—PHARYNX.

On Phlegmonous Inflammations of the Faucial Tonsils, With Special Reference to Etiology and to Local Serum Treatment.

Henke (*Archiv. für Laryngologie,* Bd. 27, Haft 2) reviews the literature very completely, and gives the results of his experiments in the use of serum prepared by the Heochst Farbwerke, which was prepared by injecting several horses with a variety of streptococcus cultures of high virulence. The sera of the different horses which had acquired immunity against a variety of streptococci were united into a mixed serum. This serum was used in conditions of peritonsillitis with abscess formation, by injecting into the center of the inflamed area two to three centimeters, at a depth of one and a half to two centimeters. In cases where actual abscess formation had occurred, no effect was noticed, except possibly to hasten the spontaneous rupture of the abscess. In other instances, where no suppuration was present, but only an inflammatory infiltration, the disease was cut short completely in twenty cases by the injection. On the day following the treatment the swelling was distinctly smaller, and on the second or third day, as a rule, completely absent. In repeated instances the previously considerable pain had become markedly diminished, so that patients were able to eat and drink without great discomfort. *Goodale.*

Retropharyngeal Abscess.

W. C. Billings and J. G. Wilson (*New York Medical Journal,* September 20, 1913). The report of a case of retropharyngeal abscess, occurring in a male adult, which was followed later by septic pneumonia and death.

The authors emphasize, first, the fact that the physical signs of retropharyngeal abscess may quickly disappear; second, the necessity for immediate evacuation the moment the diagnosis is made; third, the extreme gravity of the condition and the danger of complications.

As possible causes they give the following:

1. Infection from the middle ear via the canal for the tensor tympani muscle.
2. Sphenoidal sinus infection.
3. Necrosis of the cervical vertebræ.
4. Direct injury to the pharynx itself.

5. Extension from lymphatic gland involvement; the lymph nodes lying between the anterior surface of the vertebral column and the pharyngeal aponeurosis being especially liable to involvement.

6. Thrombosis or embolism arising in connection with septic processes. *Harris.*

The Treatment of the Tonsils.

R. Goldmann (*Monat. f. Ohrenheilkunde*, August, 1913). That some of the German school are still widely at variance with their American confreres on the subject of the treatment of chronic diseases of the tonsils is shown in this article by Goldmann. He recommends as a valuable procedure in chronic tonsillar inflammation where cheesy matter can be expressed from the crypts, the careful washing out of each crypt with a bent cannula. If after a long period of this conservative treatment and the patient still complains of local symptoms as well as general constitutional disturbances, the question of complete enucleation should be considered. The various methods of partial removal, removal with a guillotine, etc., he considers not as satisfactory as a complete tonsillectomy. General anesthetics are not to be considered, but a preliminary infiltration with one-fourth per cent novocain is recommended. His favorite position is the Rose position, but he considers Killian's method of suspension laryngoscopy as a great advance. To control the hemorrhage he uses Pean's clamps with torsion, which are left in place until all hemorrhage is stopped. Immediately after the operation he has the patients use a hot foot bath, which he finds overcomes the relaxation caused by the adrenalin. For the pain following the operation he recommends the application of novocain, followed by the application of pure trichloracetic acid. The resultant eschar acts as a plaster against infection and adds greatly to the comfort of the patient. By following this application with tincture of iodin he has been able to feed his patients soft food as early as the fourth day.

In the following conditions he considers the operation contraindicated: Hemophilia, marked cases of heart disease and advanced nephritis, a statement which most American surgeons might agree to.

In children one must proceed with great caution. If the tonsils are greatly hypertrophied, so as to interfere with respiration, a tonsillotomy should be done, but not a complete removal. Only as a last resort, where the tonsils are small and sunken and are producing marked constitutional disturbances, and where a long course of local treatment has failed to show marked benefit, should the complete operation be attempted. *Horn.*

Modern Surgery of the Tonsil.

T. H. Halsted (*New York State Journal of Medicine*, December, 1912). Since tonsillectomy has been adopted as the best operation, there has resulted in many cases much damage to the soft palate and the pillars, through the cicatricial contractions following the wounding of these muscles, and particularly of the posterior pillars. These accidental injuries follow mostly the use of the snare and finger in finger enucleation, and in operations done under general anesthesia, where the blood following the first incision has obscured the operation field.

This has resulted in much dissatisfaction with tonsillectomy as well as with the results in many cases. In order to avoid this, each case should be selected with great care, fitting the technic to be employed to the case to be operated on.

The writer mentions two distinct classes of tonsils to be removed: the hyperplastic tonsils, which may be often submerged although not adherent, or but slightly so, to the pillars, occurring most commonly in children under fifteen years old; and the tonsils more or less firmly adherent to the pillars with the surrounding fossæ obliterated as a result of repeated adhesive inflammations, resulting in buried tonsils, occurring in adults and in children over fifteen years old.

In the writer's experience the operation that removes the first class of tonsils with the capsule intact most frequently is that described by Sluder in 1911, and known as the Sluder operation. It is available in over 75 per cent.

In the second class of cases, occurring mainly in adults, the writer prefers to operate under cocain anesthesia, with the patient sitting up; a one per cent cocain solution with a little adrenalin being injected into the anterior and posterior pillars external to the tonsils.

The operation is then performed in the usual way, by dissection and snare. As some fatalities have been reported from adrenalin, due apparently to a large quantity being thrown suddenly into the circulation, only a small and highly diluted amount should be used. *Theisen.*

IV.—LARYNX.

The Surgical Treatment of Laryngeal Tuberculosis.

ARNOLDSON (*Archiv. für Laryngologie,* Bd. 27, Heft 1) reviews the statistics of six hundred personal cases, from which he concludes:

1. Laryngeal tuberculosis is secondary. The reverse relationship is extremely seldom, and does not need to be considered in practice.

2. Medicinal local treatment of laryngeal tuberculosis has no essential influence on the course of the disease.

3. Endolaryngeal surgical treatment is in general safe, being followed neither by infection of the wound nor by inhalation pneumonia.

4. Endolaryngeal excision, including amputation of the epiglottis, has the especial advantage of a rapid functional improvement.

5. Partial or total laryngeal excision of tuberculous cords may have, in suitable cases, good results, especially improving the voice, and leading to clinical healing.

6. Spontaneous healing or improvement may occur in a few favorable cases, but should not therefore lead to neglect of a rational local treatment.

7. Chief emphasis must be laid upon general hygienic and dietetic management, together with active rational local treatment in institutions for tuberculosis. *Goodale.*

Experimental Surgery of the Bronchi.

CALDERA (*Archiv. für Laryngologie,* Bd. 27, Heft 2) concludes that in wounds of the bronchi which penetrate transversely all layers of the organ, there is little danger of a fatal result, if an infection from the outside is avoided, and the margins of the wounds are immediately approximated. The microorganisms ordinarily present in the lumen of the bronchi are customarily so attenuated in their virulence that they have no pathologic significance for the individual.

The isolation of a portion of the bronchial tubes, and the interruption of its channels of nutrition, does not lead to necrosis of the affected portion and to its exfoliation. It is rather, on the other hand, inclined to unite with the upper and lower portions of the tubes through connective tissue.

which show a deposit of lime salts. This union may take place even with specimens of tissue which have remained forty-eight hours outside the system. *Goodale.*

Laryngeal Paralyses in Acute Bulbar Paralysis.

FREYSTADTL (*Archiv. für Laryngologie,* Bd. 27, Heft 2) reports a case of acute bulbar paralysis ushered in by fever and prostration, and exhibiting on the third day difficulty in swallowing and loss of voice. Laryngeal examination showed paresis of the internal, transverse, and lateral muscles. The patient was unable to swallow fluids or solids. A slow improvement followed during the following two weeks, with return of normal motion in the larynx.

Another case was observed, exhibiting also sudden onset, involving the larynx in a similar fashion, together with disturbance of taste and difficulty in swallowing. Improvement followed within a few weeks.

Both cases suggested a myelitis bulbi, arising in consequence of infection. The author concludes from his observations that Semon's law is not applicable to laryngeal paralyses of bulbar origin. *Goodale.*

Suspension Laryngoscopy.

KILLIAN (*Archiv. für Laryngologie,* Bd. 26). The author's method of direct examination is described, which he recommends especially in conditions where accurate manipulation is required. The majority of cases were laryngeal tuberculosis, requiring curetting of the ulcerations. It is also employed in cases of papilloma, especially in children, under general anesthesia. Here it was possible to remove the papillomata without tracheotomy. For purposes of demonstration to students, the method is useful. In adults it is usually sufficient to inject morphin and scopolamin, in doses of 6 dmg. scopolamin and 2 cg. morphin. This brings about a diminution in the excitability of the cerebral cortex motility as well as of sensation.

The patient is placed on his back on the operating table, with the head hanging down, supported by the apparatus in the correct position. The tongue depressor is introduced, and the base of the tongue and larynx cocainized. The laryngoscopic picture thus obtained is clearer than by any other method. *Goodale.*

Safety Pin Removed From the Larynx of a Child by Direct Laryngoscopy.

HARMON SMITH (*New York Medical Journal,* August 16, 1913). The patient was a child of two and one-half years, who was suddenly taken ill with a croupy cough. Diagnosis of bronchial croup was made. The usual measures for croup relieved the condition. Five days later there was a return of the croup with marked dyspnea. Diagnosis of membranous laryngitis was then made and an intubation tube inserted, with relief to the breathing. Diphtheria antitoxin was injected, although a culture of the throat was negative. The third attack, taking place two days later, was relieved by ipecac. An examination was made at that time with the laryngeal mirror, and a diagnosis of papilloma made. Thirty-seven days after the first examination the child was examined by the direct method by Dr. Smith, and instead of papilloma, a safety pin was seen and removed from the larynx, followed by an uneventful recovery.

The reporter calls attention to some of the remarkable incidents in the history of the case. He properly criticises the failure to have an X-ray picture taken at the onset, and dwells upon the fact that the intubation tube could be introduced and removed without altering the position of the pin, as well as the unreliability of an indirect examination in a small child.

Harris.

Relative Considerations in the Galvanoplastic Treatment of Tuberculosis of the Larynx.

BAR, Nice (*Archives Internationales de Laryngologie, d'Otologie et de Rhinologie,* September-October, 1913). The galvanocautery treatment of laryngeal tuberculosis is not new. It has passed through the period of undue enthusiasm which attends all new remedies. Today many of the most prominent laryngologists heartily favor it. The latest statistics are from the Basle clinic, where sixty-five cases have been treated by this method. Of thirty-five cases where there was no temperature, eleven were cured, five relapsed, and eleven died: five disappeared from observation. In thirty-two cases with fever where the cautery was used, there was only one case of cure, fifteen deaths, and ten not controlled. This would give, in effect, 33 per cent of cures in nonfever cases, and only 3 per cent in cases with fever.

The author comments favorably upon the division by Krause of laryngeal lesions into two groups, the one leading to ulceration and destructive lesions, the socalled infiltrating ulcerating form; the other presenting a slow evolution and offering possibilities of cure, the hypertrophic form, for which surgical measures are indicated. The epithelial distribution in the larynx also favors the use of the galvanocautery. The two surfaces of the epiglottis and the median middle portion of the vocal cord are covered with pavement epithelium. Here the ulcerations are wont to be superficial. All the other portions of the larynx, the borders of the epiglottis, the arytenoid space, the anterior and posterior portions of the vocal cords, the ventricular bands, are covered with cylindrical epithelium, which support the glands through which the infection proceeds into the submucous layer, producing the well known infiltration characteristic of the epithelial distension found in tuberculosis. In consequence, it will be very rare that we will be obliged to cauterize the median portions of the vocal cords and the surfaces of the epiglottis. The deep cauterization recommended by Mermord is favored. Thorough cocainization is essential.

The author defines the indications for cauterization as follows: (a) Tubercular tumors of the larynx; (b) circumscribed infiltration of the larynx having a tendency toward ulceration; (c) chronic ulcerations seated upon inflammations and covered by granulations, resisting all other forms of treatment; (d) unilateral affection of the larynx.

The contraindications are: (a) Pulmonary tuberculosis in an advanced state complicated by fever and cachexia; (b) miliary tuberculosis of the larynx, or of the larynx and pharynx; (c) the various cachexias; (d) pronounced stenosis of the larynx occasioned by inflammatory tumefactions of the infected parts; (e) patients who are nervous and irritable with a poor resistance. *Harris.*

A New Method for Taking X-Ray Photographs of the Larynx.

Rethi, Budapest (*Zeit. f. Laryngologie, etc.*, Bd. 6. No. 1, p. 27), has published an ingenious method by which he has succeeded in taking some beautiful X-ray photographs of the larynx. He cuts a film in a club shaped manner, about four and one-half inches long, two inches wide at the upper end, and one inch wide at the lower end. This is wrapped in black and oiled paper in a certain manner, for the details of which the original article must be consulted. After thoroughly cocainizing the pharynx and base of the tongue, the patient is laid on the table and the film introduced into the back of the throat as far down as possible. The exposure is made from below upwards, with a properly protected tube. The plates as shown are very clear and show the hyoid bone, the membrana hyothyreoidea, the contours of the epiglottis, the vocal cords and the true cords, and many other details. In pathologic conditions the plates have proved of great assistance, and an atlas will shortly be published giving many more plates. *Horn.*

Original Endoscopic Methods.

Richard H. Johnston (*Laryngoscope,* May, 1913) describes his methods of direct laryngoscopy with the patient in a sitting position and under local anesthesia. The patient is seated on a low stool with the head supported, but not held by an assistant. At the entrance of the laryngoscope the head is slightly extended and turned to the right or left, according to the side of the mouth the instrument is to be inserted. The instrument is introduced between the bicuspid teeth and passed down, the tongue being pushed to the opposite side. On the appearance of the epiglottis, the spatula end of the laryngoscope is passed behind it, and a slight pressure on the handle brings the larynx to view. If the anterior commissure is not seen, the head is pushed forward until it is in the straight position, when all parts of the larynx can easily be seen. With this method of operating and with the Jackson instruments the majority of patients can usually be thoroughly examined or operated upon at one sitting. In children under six years of age the straight method without anesthesia is used, the child being wrapped in a sheet and placed on the table with the head flat. It is possible to do away with assistants in examining the bronchi and trachea, if the patient is placed on a rather high cushion, with the head supported by another cushion. After the introduction of the bronchoscope the cushion under the head is removed and the head dropped to the plane of the table. The operator sits at the head of the table and regulates the up-and-down movement by a small pillow. *Richards.*

V.—MISCELLANEOUS.

On Local Treatment With Neosalvarsan.

Pfeiffer (*Archiv. für Laryngologie,* Bd. 27, Heft 2). Neosalvarsan is a preparation consisting of two parts of salvarsan and one part hyraldit (sulphooxylate of formaldehyd), which is neutral and soluble in water. In Vincent's angina this preparation brought about prompt disappearance of the deposits and cut short the course of the disease. In syphilitic affections of the mucous membrane, neosalvarsan was employed locally in combination with the combined salvarsan, mercury and iodid treatment. The subjective discomfort and the objective appearances showed regularly a striking and prompt improvement. In pyorrhea alveolaris, the author employed it in one case, with the result of producing prompt improvement. *Goodale.*

Gout in the Upper Air Passages.

Arthur Thost (*Archiv. für Laryngologie,* Bd. 26) divides the manifestations of gout in the upper air passages into: 1. Gout of the joints and cords. 2. Gout of the mucous membrane itself.

Gout of the Nose.—Hay fever is regarded in a large proportion of cases as one of the manifestations of this condition. In chronic nasal catarrh, gout may be assumed to exist, especially where intense reddening, swelling and irritability of the mucous membrane is found.

Gout of the Mouth and Pharynx.—Manifestations here are characterized by reddening, smooth shining appearance of the mucous membrane, with marked sensitiveness to all irritations, particularly swelling of the lateral granules and posterior pillars is present. In the mouth, gouty manifestations of the teeth have long been known, characterized by chronic destructive inflammation of the radical membrane of the teeth, with more or less marked inflammation of the pulp, and destruction of the alveolar process in the region of the affected teeth.

In the larynx gout affects the cords, joints and cartilage.

in the form frequently of deposits which may be recognized during life, and may even lead to confusion with carcinoma. These deposits may give rise to inflammation, and even fungous ulceration of the ventricular bands. *Goodale.*

Hot Air Treatment in Laryngology.

W. Albrecht (*Archiv. für Laryngologie,* Bd. 26, part 3) recommends the use of hot air in acute and subacute and chronic laryngitis, especially the dry form. In edema of the larynx, both acute and chronic, he has so far tried it only in edema of a tubercular nature, but recommends it on theoretic grounds in other forms. The curative effect is to be attributed to the absorbing property of the increased current of blood occasioned by the heat. He recommends it also in conditions of cicatricial stenosis in the larynx, on the assumption that a hyperemia and a loosening of the parts will follow, and therefore permit more readily the passage of bougies. The apparatus consists of a small box, into which hot air is introduced by means of a lateral tube of ear trumpet shape, placed over a flame. A box is so constructed as to fit over a patient's neck, while in the recumbent position, the air being drawn through opening in the side of the box. *Goodale.*

A Study of Mycosis of the Mucous Membranes of the Upper Respiratory and Digestive Tract.

Segura (*Archives Internationales de Laryngologie, d'Otologie et de Rhinologie,* July-August, 1913) reports eleven cases, all seen by him with one exception, of mycosis of the nose and throat, due to the presence of the sporotrichum. They were all characterized by the typical budding aspect of sporotrichosis. The ulcers had irregular borders. They were bathed with seropus, and the floor of the nasal fossæ was covered with thick crusts. In certain areas the presence of small follicular masses could be noted in the form of minute brown spots. In one case the destruction of the uvula and a part of the tonsillar pillars took place.

The eleven cases are reported in detail. The diagnosis in a number of them was obscure. The therapeutic test with iodid of potash cleared it up. Recovery took place in all. The author, in discussing the cases, states that in only exceptional instances was it possible, either by a histologic examination or culture, to discover the parasite. In the absence of this, diagnosis was based upon the negative Wassermann in every case, and especially upon the small dose of iodid of potash which produced a cure. In conclusion he refers to the serious results following a mistaken diagnosis of tuberculosis or syphilis. *Harris.*

The Treatment of Cancer of the Esophagus by Means of Radium.

Guisez (*Paris Medical,* No. 12, February, 1913) again reports some brilliant improvements by his method. He has increased the dose to 5 to 10 cg., and more, and uses the monobromid of radium. The radium in a small silver container is attached to a number 16 to 18 olive and swallowed by the patient, being allowed to remain in place for from four to five hours. Improvement is seen within thirty hours. The most brilliant results have been obtained in scirrhous cancers, but a very good result was obtained in fungous type.

Horn.

Meningitis and Brain Abscess Caused by the Bacillus Fusiformis Following a Needle Wound of the Pharynx.

Fruewald (*Monat. f. Ohren.,* August, 1913) reports an exceedingly interesting case from the Chiari Clinic, in which a child of four years swallowed a needle which lodged just above the larynx. In the attempt at extraction the needle was broken; the remaining piece was not located and the patient was taken from the clinic. One week later the patient returned, complaining of fever, headache and stiff neck. After several ineffectual efforts at local extraction, an external operation was done, and after great difficulty the piece was located. The patient was again discharged, but returned three weeks later with symptoms which pointed to a tubercular meningitis. The death of the patient followed in a few days, and the autopsy showed a temporal lobe abscess the size of a hen's egg with an extensive basal meningitis. The bacillus fusiformis was found in the abscess in pure culture, and undoubtedly gained entrance to the meninges from the original trauma. *Horn.*

Esophageal Tuberculosis.

Lorenzo B. Lockard (*Laryngoscope,* May, 1913), from his study of literature concerning esophageal tuberculosis, finds that tuberculosis of the esophagus is very rare, and a primary infection of the esophagus has yet to be observed, although it is believed that the first infection of the body, in some cases of glandular tuberculosis, occurs by the way of the esophagus. Infection usually comes from sputal inoculation of tissues predisposed through injury, from pulmonary tuberculosis and cancer, through direct inoculation by sputum without previous injury, from extension through larynx and pharynx, from tuberculosis due to caries of the vertebræ, from extension by continuity from caseous bronchial glands, and from unclassified sources in which the primary channel of infection cannot be traced. From the study of the analysis of eighty-nine cases it was found that there was a tendency to involvement of the esophagus in cases of chronic lymphatic tuberculosis, a frequency of association of intestinal and esophageal lesions, little significance attached to the subjective symptoms, a diagnostic value to dysphagia and odynphagia of sudden onset, and a role played by tuberculosis in the production of traction diverticula. Diagnosis must be largely made by exclusion, eliminating such diseases as syphilis, cancer, caustics, stenosis through compression, actinomycosis, nontuberculous diverticula, and sporotrichosis. Microscopic examination is essential for differentiation. Very little can be done in the way of treatment, for in the majority of cases the complication of the lesions is of such an aggravated nature as to make local treatment impossible. When tubercular esophageal lesions are diagnosed early enough, such local applications as lactic acid, formalin, orthoform, etc., give about the same results as when applied in a tubercular larynx. Stenosis may be relieved by dilatation; spasms incident to ulceration may also be relieved in the same manner. *Richards.*

Intracranial Nerve Division.

Charles H. Frazier (*Journ. Amer. Med. Assoc.*, August, 1913) describes the intracranial division of the auditory nerve for the relief of a persistent tinnitus. The tinnitus may be alone, or it may be accompanied with otalgia. Only such cases are suited for operation in which the tinnitus is so severe as to cause grave neurasthenia or serious mental disturbances; both are often the cause of threatened suicide. Care should be taken in the selection of cases, all those of central origin being excluded. The appropriate ones are those which are labyrinthine in origin; it may originate in the vestibular ganglion, in the cochlear ganglion, or in both; and as there is no means of separating the vestibular from the cochlear division, the entire auditory trunk must be sacrificed. The best cases are those in which there is loss of air conduction with preservation of bone conduction; cases with definite cochlear lesions in which the tinnitus is low pitched. The deafness resulting from the complete section of the auditory nerve is one of the obstacles to be considered, but as a rule the patient is already deaf on the affected side. The operation should only be done by a skilled operator and one who has had a great deal of experience. The appliances for securing the proper posture of the patient are absolutely essential. The displacement of the cerebellum must be effected without undue trauma on the adjacent pons and medulla, and should not be attempted without taking advantage of the additional space to be derived by evacuation of the large basal cisternæ. The separation of the auditory nerve requires patience, and although the auditory nerve is larger than the facial, no chances should be taken until the facial nerve is identified by electrical stimulation. *Richards.*

Radium Therapy in Laryngorhinology.

MARSCHIK (*Wiener medicinische Wochenschrift,* No. 50, 1912). The report of a case of scleroma of the nose and pharynx, in a man thirty years old. The pharynx and alæ nasi were greatly infiltrated, and the radium treatment was given in three sittings, for over three hours each time. After four weeks, the following results were noticed: The infiltration of the alæ nasi had almost entirely disappeared, as well as that in the pharynx, and had been replaced by healthy looking cicatricial tissue.

In a second case, that of a school teacher, aged seventy years, the radium treatment was used for a carcinoma of the right upper jaw. The neoplasm had extended to the posterior orbital region and had caused fixation and protrusion of the eyeball. The maxillary sinus, which had been opened through the canine fossa, was found to be filled with a tumor mass. The diagnosis of a suppurative sinusitis had been made. The tumor masses were removed and the radium treatment used, and three months afterward, no recurrence had started. The patient also gained greatly in weight.

In a third case, that of a man fifty years old, with a carcinoma of the upper part of the esophagus, just under the cricoid cartilage, with perforation into the trachea, the radium treatment was used after a tracheotomy had been performed. so that the radium application could be directly applied. The result was very marked within a short time. An esophagosocpy. which before had been impossible, could now be done, and the larger bougies could be readily passed. Patient later on died of a pneumonia, resulting from his perforated tracheal wall.

Theisen.

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XXIII.

STUDIES REGARDING ANAPHYLACTIC REACTIONS OCCURRING IN HORSE ASTHMA AND ALLIED CONDITIONS.*

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The object of the following paper is to review briefly our knowledge of anaphylactic shock occurring after the administration of antitoxic sera, and to describe some studies which may prove of value in affording indication of the existence of this danger.

The subject of anaphylaxis occupies now a relatively large place in literature, but no general agreement has yet been reached in regard to much of its phenomena. For our present purpose, however, it may be useful to quote the following definition of protein sensitization as formulated by V. C. Vaughan:

"(1.) Sensitization consists in developing in the animal a specific proteolytic ferment which acts upon the protein that brings it into existence and on no other.

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*Read at the Thirty-sixth Annual Congress of the American Laryngological Association, Atlantic City, May 25, 1914.

"(2.) This specific proteolytic ferment stored up in the cells of the animal as a result of the first treatment with the protein remains as a zymogen until activated by a second injection of the same protein.

"(3.) Our conception of the development of a specific zymogen supposes a rearrangement of the atomic groups of the protein molecules of certain cells in the animal body or an alteration of the molecular structure. In other words, we regard the production of the specific zymogen not as the formation of a new body, but as resulting from an operation in the atomic arrangement within the protein molecule and a consequent change in its chemism.

"(4.) Some proteins in developing the specific zymogen produce profound and lasting changes in molecular structure, while the alterations induced by others are slighter and of temporary duration, the molecular structure soon returning to its original condition.

"(5.) Bacteria and protozoa are living, labile proteins, while egg white, casein, serum albumin, etc., are stable proteins. The proteins of the one group are in an active and those of the other in a resting state, but both are essentially proteins, made up of an acid or poisonous chemical nucleus and a basic or nonpoisonous group. The former in its effects upon animals is the same, whether derived from the living or the dead protein, and the latter in the one instance induces specific immunity, and in the other specific susceptibility; but the immunity and susceptibility each consists in developing in the animal body the capability of splitting up a specific protein. If the living protein be split up before it has time to multiply sufficiently to furnish a fatal quantity of the poison, the animal lives, and we say that it has been immunized. If the stabile protein be introduced into the animal, it leads to the development of a specific proteolytic ferment, and if enough of it to supply a fatal dose be reinjected after this function has been developed, the animal dies. The first or sensitizing dose of egg white injected into an animal is digested just as surely as is the second, but the process goes on so slowly that we see no effect; but in fact the first dose has affected the animal profoundly—so profoundly that the change wrought in certain cells of the animal body persists for months, possibly for years, and may be transmitted from the mother to her offspring. We do not say that the animal is sensitized unless some immediate and striking effect follows our treatment, but this is wrong. An immediate effect, especially a fatal issue, on reinjection, depends upon the rapidity with which the protein is split up and its poisonous constituent set free. The sensitizing injection leads to the development of a specific enzyme, and the protein of this injection is so slowly digested that the poison set free at any one time is not sufficient to produce any recognizable effect. If time enough be allowed between the sensitizing and the reinjection for the accumulation of a large amount of the specific enzyme, then the protein is split up promptly and anaphylactic shock and death result."

In the administration of diphtheria antitoxin about one-third of the number of individuals who received injections for the first time, the socalled "serum fever" is observed in the course of six to twelve days, consisting of edema and a rash resembling urticaria. Von Pirquet explains this phenomenon on the hypothesis that some of the unchanged serum remains in the body until sensitization is sufficiently developed to bring the effects of the toxin body up to the level of clinical observation.

"This demonstrates that a reinjection is not necessary in order. to develop the state of protein sensitization. The evolution of the specific enzyme begins soon after the introduction of the foreign protein and gradually proceeds, and the liberation of the protein poison increases pari passu. It is not until the effects of the liberated poison approach the 'level of clinical observation' that we recognize them, but this is not at the beginning of the process. Sensitization of the body cell probably begins as soon as the foreign protein comes in contact with it. The foreign protein so impresses the body cell that the latter undergoes such changes in its intramolecular structure that it elaborates a new and specific enzyme. The fact that soluble proteins sensitize so much more promptly and efficiently than suspensions, renders it probable that cellular penetration is essential to the most thorough effect. The additional fact that relatively dilute solutions sensitize more promptly and more efficiently than more concentrated ones, suggests that degree of molecular concentration has some influence upon the processes of sensitization."

Von Pirquet and Schick observed that in individuals who received reinjections after intervals of twelve days or longer, a certain number presented a reaction similar to "serum fever," while occurring several days earlier. In other individuals the reaction appeared within a few hours, often within a few minutes, after the reinjection. Those individuals are fully sensitized, and it is in these that anaphylactic shock should be feared.

The duration of sensitization is apparently unlimited. Darling reports two cases of anaphylactic serum disease occurring over six years after primary injection of horse serum; Thaon a case following after four years on a reinjection of tetanus antitoxin. Gillette reports a case of an asthmatic, fifty-two years of age, in which death followed in five minutes after the injection of diphtheria antitoxin. In many articles on the subject the statement is made that asthmatics are liable to anaphylactic shock after the injection of horse serum, but no attempts, so far as I am aware, have been made to define with precision the types of asthma which are susceptible. Dr. Valentine of Lexington, Massachusetts, has kindly allowed me to refer to a case occurring in his practice four years ago, in which a boy, sixteen years of age, a sufferer from asthma, was given an injection of diphtheria antitoxin followed by death in the course of a few hours. The patient had never received a previous dose of antitoxin.

In regard to the prevention of anaphylactic shock and its treatment, the following suggestions have been made:

Wiedemann states that in sensitive cases another variety of serum should be employed, and reports a case where ox serum was given successfully to a patient who had shown intolerance to horse serum. This serum is prepared by the Hoechst Farbwerke, but is not, so far as I know, procurable in this country. Besredka states that the heating of serum to 56° C. tends to suppress the phenomena of sensitization, and that all the antitoxin prepared at the Pasteur Institute is subjected to this temperature. Anaphylactic shock is said to be less frequent and severe in France than in other countries. The internal administration of serum in intolerant cases has been suggested by Asam, but this might destroy the efficacy of the antitoxic principle from digestion, and furthermore a delayed anaphylaxis might occur, as seems to have been the case in an instance reported by Wiedemann. If shock has occurred the hypodermic administration of atropin has been suggested. In one instance of dangerous symptoms arising from sensitization by thyroid extract (O'Brien), venesection was employed with prompt relief. Ether is also recommended for the purpose of diminishing spasm of the arterioles. In cases of diphtheria where it is absolutely necessary to control the disease, one may be justified in following the recommendations of Rosenau and Anderson, of administering a minute dose of antitoxin for the purpose of exhausting the zymogen in the system, and then following this, after the anaphylactic symptoms have disappeared, by a full dose of antitoxin. A case reported by Wiedemann, however, shows that even so small an amount as this, when administered subcutaneously, may be attended with danger. A patient three years of age, who two years previously had received 30 cc. of diphtheria antitoxin, was injected with one drop. This was followed by severe dyspnea and cyanosis, although the patient recovered.

In addition to such conditions of sensitization to horse serum, other conspicuous examples occur, such as the intolerance to various pollens found in hay fever, and the reactions following the injection of certain foods, such as eggs, strawberries, fish and various nuts.

Although the statement is repeatedly found in the literature that asthmatic individuals may show anaphylactic shock after the administration of antitoxic sera, no systematic observations have been made in regard to determining actually when danger may be anticipated. Such an investigation could not justifiably be carried out by the subcutaneous injection of horse serum, since in the first place alarming symptoms might be occasioned if an excessive dose were administered, and in the second place it is possible that certain individuals might receive the test dose without unusual symptoms, but might thereby be sensitized so that later if diphtheria actually occurred the injection of antitoxin might be followed by anaphylactic shock.

The Von Pirquet test for tuberculosis gave rise to the suggestion that a similar skin reaction might be found in individuals sensitive to horse serum, and a number of patients were consequently examined in this manner. On theoretic grounds those individuals who showed vasomotor symptoms in the neighborhood of horses would be most likely to show a reaction, and consequently all those of this class of whom I had records were asked to report for the test. Also a number who had a history of vasomotor symptoms of other types were examined.

The tests were made in the following manner:

1. The lobe of one ear or the skin of the arm was moistened with a drop of diphtheria antitoxin prepared by the Massachusetts State Board of Health, and a superficial cut was made with a paracentesis needle.

2. A drop of the same antitoxin was placed in one nostril, upon the anterior end of the lower turbinate.

REPORT OF OBSERVATIONS.

Twenty-seven cases were examined by one or both of the above methods. These may be grouped as follows:

1. Cases in which horses had been known to excite nasal vasomotor symptoms or an asthmatic attack.

2. Cases showing no reaction to horses, but in whom the asthma was apparently associated with bronchitis alone, or occurred only during the summer in connection with hay fever.

Eleven cases with a history of sensitiveness to horses were examined with the following results:

Case 1.—Miss W., twenty-eight years old. For eight years asthma more or less constant throughout year, increased markedly by the neighborhood of horses. Has been under observation for six years. A large cystic right middle turbinate was removed in 1909 without influence on asthma. Tonsils were removed for septic detritus four years ago. During past two years asthma has been much less troublesome, and she is able to drive behind horses, although the air of stable excites an attack.

A drop of diphtheria antitoxin was placed in each nostril. Within five minutes the mucous membrane of both lower turbinates and of the septum became pale, edematous and covered with serous fluid. The clinical picture was that of typical hay fever, and the symptoms passed off in the course of two hours. A week later a scratch was made in the skin of the lobe of one ear, and the same antitoxin applied. In three minutes the patient stated that the ear itched, and examination showed a white, slightly raised area of the skin immediately surrounding the scratch, while the skin beyond this white area showed reddening and general swelling, the lobe of the ear as a whole being about twice the thickness of the other. Five minutes later the white wheals had disappeared, and the surface of the skin was diffusely reddened. In the course of the next hour the edema of the lobe began to diminish and two hours later had disappeared.

In order to determine whether the skin reaction was due to the trauma itself or to the serum, a few days later a similar cut was made in the lobe of the other ear, but no serum was applied. No change whatever was noted in the surrounding skin. Egg albumen was applied next with negative result. The watery extract of June grass was also tested, both on the skin and in the nose, with negative result.

The tests with the horse serum were repeated, always with the same result. It was found that if diluted the serum gave a less marked reaction, which also came on several minutes later. A ten per cent dilution with water was sufficient to cause a retardation of several minutes, and while the skin showed diffuse reddening and swelling, the white wheal bordering the cut did not appear. A one per cent dilution still showed local reaction, but proportionately less intense.

In view of the experiments of Rosenau and Anderson, who found that sensitized animals may be rendered refractory if they receive daily minute doses of serum subcutaneously for ten or more days, it was determined to immunize the patient if possible to horse serum. While it would have been desirable to administer the serum hypodermically in order to effect its parenteral digestion, yet this was not easy, owing to the fact that the patient lived at a distance and also demurred at the suggestion of hypodermic administration. A ten per cent solution was therefore given the patient to use in an atomizer, to spray into the throat three times a day a few minutes before meals, in the hope that some absorption of the serum might occur through the mucous membrane of the fauces and through the walls of the empty stomach without alteration by gastric digestion. During the night following the first day of this administration the patient experienced considerable asthmatic disturbance, but on the following day and for the next two days persisted faithfully with the spraying, although the difficulty in breathing became almost constant. When I saw her on the fourth day the respiration was labored and the chest full of whistling rales. The spraying was then stopped and within twenty-four hours the asthma ceased. After a week of freedom from asthma spraying was resumed, with a one-tenth of one per cent solution of serum. No asthma occurred, and the strength of the serum was then gradually increased. In four weeks a ten per cent solution was used without exciting asthma. At this time a skin test with a ten per cent solution gave negative results, but the pure serum gave a reaction about equal in intensity to that caused originally by the one per cent solution.

During this period the reaction of the patient to the neighborhood of horses was noted. Making due allowance for the possibility of suggestion, a distinct improvement in tolerance seemed evident. At the present time she can unsaddle her horse after a ride without exciting further vasomotor symptoms than sneezing several times, although such proximity would previously have excited severe asthmatic breathing.

Case 2.—Mrs. B., thirty years old. For ten years the neighborhood of horses has produced sneezing, more severely of late, and accompanied by a sense of constriction in the chest. The general health is otherwise good. Horse serum applied to a scratch on the skin produced in six minutes considerable reddening and edema without the marginal white line of the preceding case. In the nose the serum gave no result. On the following morning the skin test was repeated with the same serum, without exciting any local reaction whatever. This is difficult to explain except on the hypothesis that the first reaction exhausted sufficiently the amount of zymogen in the system. What the dose of serum should be to accomplish this result is doubtful, but the amount which could enter the system through a scratch certainly must be extremely small.

Case 3.—Mr. F., forty-seven years old. For many years severe asthma excited by horses. Deviation of the septum and chronic ethmoiditis on the left side. Horse serum applied to a cut of the skin produced in five minutes a marked reaction similar to that of Case 1. A moderate amount of edema and watery discharge was occasioned by the nasal test.

Case 4.—Dr. B., forty years old. Until five years ago nasal vasomotor disturbances and asthma excited by the vicinity of horses. On several occasions when hunting deer or moose, asthma has been caused by handling the dead animals. Without treatment or known reason this tendency has of late years gradually diminished, and horses now cause no discomfort. Tests with the serum in the nose and on the skin caused no reaction.

Case 5.—Mrs. V. Seen first in 1906 for asthma of many years' duration. Had had much treatment of nose without effect. In intervals of attacks chest examination was negative. Has had one or two small dogs continually about her. For several years following the first examination it was observed that on being away from the dogs she was free from asthma, and an attempt was made to have her dispose of the animals, but without success. In November five years ago she was given pollantin by her family physician for an attack of sneezing and moderate asthma. This was immediately followed by exceedingly severe dyspnea, nasal obstruction, profuse watery flow from the nose, being the worst attack that she had ever experienced. The symptoms subsided in the course of twelve hours. Two years ago both dogs were disposed of on account of old age, and the patient has since then had no dogs in the house. During this period she has been entirely free from asthma, although a sense of constriction in the chest is experienced when in the neighborhood of horses. When I explained the test which I wished to make, the patient was unwilling to have the antitoxin applied to the nose, as her recollection of the asthma following pollantin was so disagreeable, but consented to have the test made in the ear. Within two minutes after the application of antitoxin to the scratch on the lobe of the ear, a clearly defined, elevated, white area appeared, bordering the scratch, surrounded by a diffuse reddening, the whole lobe becoming symmetrically swollen, this resembling perfectly the appearance on the skin which would be produced by a nettle. Five minutes later the white area became changed to red, as in Case 1, and the local manifestations cleared up slowly in two hours.

Case 6.—Miss J., twenty-four years old. Seen in 1909 for recurrent colds and asthmatic attacks since three years of age, always excited by horses, although also occurring at all times in the year, often without assignable cause. Bilateral ethmoiditis existed, characterized by enlargement of middle turbinates, and polypoid degeneration of the mucous membrane. In 1910 the ethmoid cells were curetted, and the patient experienced relief for a period of ten months, when slight shortness of breath developed. One year later, in November, asthma appeared following a cold, and a return of polypoid tissue was observed in the right ethmoid region. This was curetted with relief from the asthma. In March of this year the patient was tested by the methods above described, with positive result, one drop of the antitoxin in the right nostril causing a typical vasomotor swelling and pallor of the mucous membrane, completely obstructing respiration on that side, and attended by profuse watery discharge, the other side remaining unaffected. The right eye became suffused with free lacrimation. The skin test of the ear developed in four minutes as a clearly defined anemic area of one-fourth inch in width bordering the incision, and contrasting sharply with the hyperemic neighborhood. The whiteness of this area was especially well defined against the generally reddened lobe, fading in four minutes, leaving a generally reddened edematous lobe which returned to normal in three hours.

Case 7.—G. T., male, twenty-four years old. Seen in February of this year for acute ethmoiditis which cleared up after ten days. There was an old right chronic ethmoiditis with polyp formation. Polypi had been removed in the past on several occasions. The patient stated that during the summer the neighborhood of horses would occasion sneezing and what he described as asthmatic feelings. This condition was apparently not sufficient to cause much discomfort. The serum test in the nose gave a delayed reaction, occurring in about half an hour, and lasting for two hours later. The serum test on the skin gave negative results.

Case 8.—Miss G., twenty-four years old. Seen last summer for nasal obstruction and hay fever, aggravated in the neighborhood of horses. During the following winter she was seen on three occasions for nasopharyngeal catarrh, and stated that she was at this season able to go near horses without symptoms. A serum test of the nose gave no reaction.

Case 9.—Miss C. Seen in May, 1913, for perennial vasomotor rhinitis, increased by the neighborhood of horses in summer. No asthma. During the winter is able to come near horses without symptoms. The serum test in the nose gave negative results. The skin test was not applied.

Case 10.—J., male, twenty-three years old, brother of Case 6 In general well. Sneezed since boyhood whenever in the neighborhood of horses. No asthmatic symptoms. Submucous resection had been done by another physician one year ago. Except for small septal perforation, nose essentially negative. Introduction of antitoxin into nostril not followed by reaction. Skin test on ear negative.

Case 11.—E., male, sixty years old. Hay fever many years. Horses excite sneezing and watery nasal discharge, but no asthmatic symptoms. Chronic nonsuppurative ethmoiditis and polypi. The serum tests of the nose and skin were negative.

Six cases of bronchial asthma which gave no history of irritation from horses were examined by the nasal and skin tests with negative results. Five cases of single uncomplicated hay fever received the serum in the nose and on a cut of the skin without exciting reaction.

SUMMARY OF CASES.

In five patients with horse asthma the application of horse serum to an abrasion of the skin produced within a few minutes sharply localized edema and reddening. In three of these cases the introduction of horse serum in the nose caused edema of the nasal mucous membrane, together with profuse watery discharge and sneezing.

One case of horse fever without asthma gave a delayed reaction to the nasal test (although this was reported and I cannot vouch for it), but was negative for the skin test. A similar case gave a delayed but definite reaction to the skin test, but showed no nasal symptoms. Four of the horse fever cases without asthma were negative for both tests. It is worth noting that in Cases 6 and 10, while the sister, who had horse asthma, reacted markedly to both tests, the brother, whose vasomotor symptoms from horses affected the nose alone, showed no reaction.

Six cases of bronchial asthma and five cases of hay fever were negative for both tests.

Three cases without vasomotor symptoms which had received immunizing doses of antitoxin several months previously showed no reaction to the tests.

The results of these experiments indicate that a localized anaphylactic reaction from horse serum may be occasioned in certain individuals who experience asthmatic disturbances from the neighborhood of horses. The severity of these vasomotor symptoms appears to be a determining factor in the production of the reaction, since patients with nasal symptoms alone do not appear to be sufficiently sensitized to horess to give an immediate positive skin test.

The number of cases thus far tested is too small to justify definite conclusions in regard to the value of these tests in detecting the existence of a state of sensitization to horse serum, but if further studies should confirm them, they should prove to be of assistance to the physician who is in doubt whether in a given case it is safe to administer antitoxin. It is, therefore, suggested that a preliminary skin test with horse serum be made in all patients who have previously received an injection of antitoxin derived from horses, whether tetanus, diphtheria, or plague serum. Furthermore, in all patients who are about to receive antitoxin for the first time, inquiry should be made as to whether they have ever been disturbed by asthmatic symptoms when in the neighborhood of horses, and if so they should first be tested.

So far as these experiments go, they would indicate that in horse asthma a dangerous anaphylactic shock may occur after the hypodermic administration of horse serum. In horse fever with nasal symptoms alone, this danger is less or not at all to be feared, and in other types of asthma and of vasomotor rhinitis it is not present.

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XXIV.

INTRANASAL OPERATION FOR THE RELIEF OF NASOLACRIMAL STENOSIS.*

By E. M. Holmes, M. D.,

Boston.

The purpose of this paper is to report a procedure for the relief of stenosis of the nasolacrimal duct. There is not sufficient time to allow a review of the literature, and it is not necessary to go extensively into the pathology and the resulting symptomatology of this condition. Every ophthalmologist knows how annoying a partial stenosis of the nasolacrimal duct is, and what a serious condition may follow an absolute blocking of this tube. There is not only the annoyance of the overflowing tears down the cheek, but there is almost always, sooner or later, a more or less serious dermatitis of the whole area, which is constantly soaked.

Under normal conditions the nasolacrimal duct is a tube about 20 mm. in length and about 4 mm. in diameter. It connects the lacrimal sac above with the anterior portion of the inferior meatus of the nose below. The upper portion of the duct is enclosed in a bony canal made up of the lacrimal bone and the nasal process of the superior maxillary bone. Between the lumen of the duct and the anterior portion of the middle meatus of the nose there is the nasal mucous membrane, the underlying periosteum, the bone, and the mucous membrane of the duct. The bone at this point is usually very thin, about the thickness of paper. The lower portion of the duct lies for a greater or less distance under the mucous membrane of the anterior portion of the outer wall of the inferior meatus. This portion of the duct is more or less collapsible and forms the socalled Hasner valve. Whether this is, or acts, as a valve is not important at present. It is a fact that through infection of the nose there is frequently extension of the inflammatory processes into the nasal end of the duct, and that occasionally there results partial or complete obliteration of the duct. Slight stenosis may produce no symptoms. More blocking may give symptoms only when for any reason there is a greater overflow of tears. Only the marked cases which produce constant and distressing symptoms, and which are not relieved by the passing of sounds, come into the class which we are now considering. Although these extreme cases are not common, they are not extremely rare, and any procedure which can give relief is worthy of our consideration. The natural nasal opening of the lacrimal duct is well situated to care for the inflow of the lacrimal secretion, and under the usual normal conditions the individual is not aware of the existence of this secretion. Even when for any reason there is an increased flow, it is not noticed within the nose until the flow becomes excessive.

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*Read before the New England Ophthalmological Society, April 14, 1914.

When we make an artificial terminal in the middle meatus the secretion runs forward and downward over the anterior end of the lower turbinate, and an amount which would give no sign of its existence in the lower fossa shows itself and necessitates the use of a handkerchief. Under ordinary conditions with a normal lacrimal flow the secretion is absorbed into the inspired air and there are no signs of its existence. When the flow beçomes too profuse for normal absorption into the air there is the condition which is seen in the normal case, only it is noticed sooner and it is more pronounced. In whatever manner we drain the lacrimal sac into the nose, I am of the opinion that we shall find that the secretion will not be as easily and as well cared for as when it is drained into the inferior meatus in the normal condition. However, the condition resulting from a stenosed duct is so disagreeable and constant that the slight and transitory inconvenience caused by the secretion at the tip of the nose is a comparatively trivial matter. If we can establish drainage to care for the overflow from the eye, it is infinitely better than to remove the reservoir which is constantly washing and is ever ready to flush the conjunctival sac whenever there arises a need for such cleansing. I think that all will agree that it is far better to reestablish an outlet for the excessive flow of tears than it is to remove the lacrimal gland, and with it its physiologic protection of the eye.

Twelve years ago, in June, I operated upon my first case for complete obstruction of the nasolacrimal duct. A probe could not be passed into the last third of an inch of the duct. The patient's condition was one of constant suffering, as the whole left cheek was in a severe state of inflammation with areas of excoriation. At this time I passed a small eye probe as far into the duct as possible, and then estimated its distal position. The anterior portion of the middle nasal fossa was thoroughly cocainized and a vertical cut was made through the mucous membrane. This was elevated both forward and backward, and then with a curette the bony covering of the duct was removed with the outer mucous membrane. The probe was now easily passed through the artificial opening into the middle fossa of the nose. A piece of silver wire about eighteen gauge and about one and one-fourth inches long was passed through the nasal opening into the duct upwards as the probe was withdrawn from above. A disc of gutta percha was attached to the nasal end of the silver wire, and so shaped as to give support to and maintain the whole in the desired position. The wire was worn for about three weeks, when there was apparently perfect healing. After removal of the wire the lacrimal secretion discharged through the artificial opening, and continued to do so for four years, since which time I have neither seen nor heard from the patient.

In January, 1903, I operated upon a man who had had symptoms of nasolacrimal duct stenosis for eight years. He had received an injury to the nose just previous to the beginning of his lacrimal trouble. As in the first case, the finest eye probe could not be passed through the distal end of the duct. The results of the first case were so satisfactory that it seemed advisable to try a similar procedure in this case. The anterior end of the lower turbinate was cicatricial and apparently closer to the outer wall of the fossa than usual. A similar operation was carried out as in the first case, and the same treatment was applied. There was marked relief for about three weeks after removal of the silver wire, when there began to be signs of impatency. It was with difficulty that the smallest eye probe could be passed through the duct. Effort was made for several weeks to dilate the stricture of our artificial opening, but with no permanent results; after all efforts the case was a failure.

In September of the same year a woman was referred by the patient who had been cured by operation. She had apparent blocking of the right lacrimal duct, with the usual disagreeable symptoms. She had been probed off and on for several years without apparent improvement, and at time of examination showed a low grade purulent dacryocystitis. A small eye probe was passed through the duct with considerable difficulty. The sac was douched and treated with hydrogen peroxid, in hopes of cleaning the purulent condition before attempting operative interference. After three weeks' treatment there was still some purulent fluid always found within the sac, and it was thought best to try and establish good nasal discharge. The patient was anxious, as she had seen the results in the case of her friend. The operation was carried out in all respects as in the first two, and the after-treatment was the same except there was added douching of boracic acid solution into the lacrimal sac and duct. For about five weeks after the operation the results were very gratifying, there was no overflow of tears, and the condition of the sac was nearly if not entirely well. At about this time there began to be some setting back of the secretion. The duct was dilated by probes every second day for several weeks, but without avail. Another operation was carried out to try and establish an outlet as high as possible within the nose. The results of this effort were satisfactory for six weeks, when the cicatrices again closed the duct. These two failures following only one success put a damper upon the first success, and another case was not attempted until March, 1907. This case was in most respects similar to the second and third, and therefore its review is not essential. After these experiences I gave the subject little thought until in June, 1911, when a very marked case sought relief from these disagreeable conditions.

This patient was twenty years old, and her life and prospects were wrecked by the constant overflow of tears and the resulting lesion of the skin upon the cheek. In studying the case and reviewing the preceding failures, it seemed that if some method could be devised to prevent extensive granulation with the resulting cicatrices, the unfavorable results could be reduced if not entirely obliterated. By the methods described as used in the first cases we had a rather long slit in the nasal mucous membrane and a comparatively large granulating area about the cut surface of the walls of the duct. In the first case the epithelium evidently thoroughly covered these granulations under the wire which was placed as a form. In the other cases this did not take place, and the results were failures. It seemed that if we could make a U-shaped incision and thus lift a flap and then turn the lower portion of the flap up and under the upper portion, we would produce a surface of mucous membrane which would not granulate, but would form the inner lip of the newly formed outlet of the duct, if after the duct had been opened a suture were passed through to hold the folded portion in place. This procedure was carried out in this case, and at the end of ten days the wire support was removed. A bougie was passed every day for several days, and then twice each week for six weeks. Never were there signs of stenosis, and there was perfect control of the tears. The only disturbance was that during excessive flow of tears there was a greater necessity for the use of the handkerchief than when the flow was carried normally into the inferior meatus of the nose.

In December of 1911 this operation was carried out for the relief of stenosis of the left duct in a man forty-three years of age. Judging by his history he had a purulent dacryocystitis four years previously. This cleared up in about two or three weeks, but there was always some trouble afterwards. The condition progressed, and for a year before examination there had been much inconvenience. The duct had been probed upon several occasions, and six months previously had been probed every day for over two weeks. There was some relief for a short time, and then the condition was as bad as before. We were unable to pass a probe through the lower portion of the duct. A similar procedure was carried out as in the preceding case, and the results after a year were excellent. There has been no report since, but we can assume that he is well or we should likely hear from him.

After the results in the last two cases another was met in October, 1912. This patient was a robust young man of twenty-four years, who had been much annoyed by an overflow of tears from the left side following a grippy attack, with purulent discharge from the nose five years previously. The smallest probe was passed through the duct, but a larger one would not pass through the lower portion. With confidence gained in the two preceding cases, this operation was undertaken and every step progressed smoothly. The same after-care was given, yet with all we could do there was a resulting stenosis and the case was an absolute failure.

In August, 1913, a woman of forty-six years sought relief from an overflow of tears from the left eye, of a number of years' standing. The duct had been probed at various times for seven or eight years. She was a teacher and was much annoyed by having to wipe tears from her cheek. At time of examination there was little dermatitis of cheek, and only a slight overflow of secretion. The patient said that there had always been slight trouble during warm summer weather, but she wished to, if possible, be rid of the annoyance she experienced every winter. The flap operation was carried out, and when I last saw her in January there was a perfect result.

January 16, 1914, I operated upon the last case, a girl who was referred at the City Hospital by Dr. Greenwood of the ophthalmic service. There was an overflow from the left eye, and the sac contained a viscid, somewhat milky fluid. I attempted to perform the operation above described under ether, as the patient was very nervous and would not submit to an operation without a general anesthetic. After lifting the flap there was a discharge of considerable pus, and there was found to be much underlying necrotic bone. This broken down bone was removed by a curette and the wound packed. The condition has been relieved, but it seems improbable that there will be a real cure.

In all there are too few cases to give valuable statistics, for several hundred well studied cases are necessary to give much weight to percentages. If we can judge anything by these cases, it would seem that a simple opening made through the middle fossa into the nasolacrimal duct, even with careful and persistent treatment, is liable to end in cicatricial stenosis and failure, for three of the four cases were unsuccessful. It would also seem by the use of the flap operation, which was carried out in the last five cases, we may hope for a good percentage of success, for of the five cases, three were perfectly successful, one was an absolute failure, and one was moderately successful, and this last case was one which it was impossible to successfully treat on account of the extensive bony necrosis.

XXV.

THE EVOLUTION OF THE TONSILLOTOME.*

By Stanton A. Friedberg, M. D.,

Chicago.

The modern tonsillotome or guillotine, with its various modifications, is the outgrowth and adaptation of instruments which had for their original purpose the removal of the edematous or elongated uvula. Jonathan Wright in his History of Laryngology[1] states that the "inception of the Mackenzie tonsillotome may be seen on referring to Bell's System of Surgery, 1791, Vol. III, p. 87." Mackenzie,[2] quoting from the same author, but from the edition of 1783, also refers to this instrument as the one from which Physick drew his inspiration when he devised his tonsillotome. Physick himself mentions Bell's instrument as the one which he modified. The instrument referred to was the socalled uvulatome. Although considered as Bell's, I could find no claim to priority or originality in his writings, and it was of some interest to learn from what probable source he obtained his knowledge of its use. As a matter of historical fact, it was simply a modification of preexisting uvulatomes. The appearance of the first uvulatome antedated Bell's publication by nearly one hundred and fifty years. Likewise the adaptation of an instrument of this principle to the tonsil had been made by Desault many years before Physick announced his invention.

The earliest description and illustration of the uvulatome that I have been able to find appears in the Historiarum Anatomicarum Rariorum Centuriæ of Thomas Bartholin,[3] Hafniae,

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*Candidate's Thesis, American Laryngological Rhinological and Otological Society.

1641. Under Historia 88 appears the title "Instrumentum Chirurgicum Novum pro Uvula Abscindenda." Unlike some of the new instruments of today, there is not much question of the propriety of the use of the term Novum in this instance. Previous to the appearance of this uvulatome, the scalpel, scissors and the familiar snare of Hildanus were employed in removing the diseased uvula.

Bartholin speaks of the prevalence of a certain kind of catarrh which occurs in Norway during the winter months. The disease spreads to the fauces and uvula, and involves the latter to such an extent at times as to necessitate surgical intervention in order to prevent suffocation. For the surgical relief of this condition, excision of the swollen and projecting uvula by means of the scissors is mentioned, and the author proceeds to tell how "a certain Norwegian peasant, Canute of Thorbern, had recently devised an instrument with which he excises the swollen uvula with great speed and dexterity in the twinkling of an eye." (Fig. 1.)

A somewhat literal translation of his description of the instrument is as follows:

An oblong and narrow metal plate, eleven inches in length, is provided at the extremity with a knob which makes possible a firmer hold. Gradually increasing in width, the instrument reaches about the middle a width of about two inches; thence continuing it forms a square body of one and one-half inches in length, shaped and fashioned for depressing the tongue, rounded at the end, and provided on the rounded surface with a deep groove which receives the sharp and curved edge of a blade. This blade can be extended and opened at will by means of certain appliances on the other side of the metal plate in order to receive the uvula to be excised between the edge of the blade and the wooden piece; the other side of this instrument has a movable lever which extends the metal blade attached to it, or holds back the retracted blade until its use demands its opening. Two bands are attached to this lever, one of which holds the extended blade in place, the other relaxes it when closed. The inner side of the instrument looks like a flint lock; the other side is a flat surface, which is slightly curved, depresses the tongue, and does not interfere with the view of the surgeon; it also hides the lever and bands attached to the appliance, that a timid person may not suspicion evil."

He speaks of the method of Celsus with a volcella; Aquapendens, who used scissors, and Hildanus, whose instrument he describes as clumsy, slow, and disagreeable for the patient and inconvenient for the surgeon. "The first figure (Fig. 1-A) shows the instrument with the lever drawn back and the metal plate hidden in its groove; the other figure (Fig. 1-B) shows the lever raised, the blade projecting, and ready to receive the uvula. The various parts of the instrument are indicated by letters.

The manner of using the instrument was as follows: The lever (C) being raised, the metal band (D), attached to the lever at (e), was also raised so that a space was left between the sharpened part of the blade at (E) and the rounded block of wood (B). The uvula being received in the open space, the part which has a catch to hold the lever is loosened by the finger and the lever with its plate is drawn back, thus excising the uvula.

As a further recommendation it was stated that it was also particularly efficacious in the removal of warts and tumors in other parts of the body. That the instrument was in somewhat universal use is borne out by the fact that it was also pictured and described in Scultetus' Armamentarium Chirurgicum.

A less complex and simpler instrument was that proposed by W. T. Rau as a modification of the Thorbern uvulatome. I was not able to consult the original description, but a representation of the instrument appears in the "Erlauterter Nuck" of Heinrich Bass,[4] published in 1728. Heister in his Institutiones Chirurgicæ[5] also shows and describes this uvulatome. It differs essentially from the one described by Bartholin in that it has a support on its under surface by which it may be grasped more firmly. The main difference, however, is found in the substitution of metal for wood, and that the blade (A) cuts from before backwards. (Fig. 2.)

The third modification of the uvulatome is that shown by Benjamin Bell.[6] It is based on the same principle as Rau's instrument, that is, a sliding knife in a groove, passing over a fenestrated plate. His description is as follows: "An instrument for removing the uvula by excision. That part of the uvula to be removed being passed through the opening in the body of the instrument, the cutting slider, which ought to be very sharp, must be pressed forward with sufficient firmness for dividing it from the parts above." (Fig. 3.)

About this time the first application of the principle embodied in the above described uvulatomes as applied to the removal of the tonsils was made. Desault (1744-1795), whose surgical works were collected and published by his friend and pupil, Bichat,[7] opposed the use of the knife in removing the tonsils, on account of the danger of injuring the surrounding soft parts. Accordingly he employed a modification of an instrument known as a kiotome or cystotome, an appliance that was first used for dividing cysts of the bladder. This consisted of a silver sheath which was notched into a half-moon shape at one end and at the other extremity a ring was attached on either side. A sharp edged blade passed through the sheath across the notch. The operation was performed by grasping the tonsil with a hook, pulling it forward and fitting the notched portion about so much of the gland as it was desired to remove and then passing the blade through the sheath. As with the Thorbern instrument, this one could also be used advantageously for conditions in other parts of the body. The advantages claimed were ease of application combined with rapidity and safety and little hemorrhage. If section was not accomplished at the first cut, owing to the size of the tonsil, the blade could be applied a sufficient number of times to complete the operation without removing the instrument. (Fig. 4.)

From a perusal of the literature of the period as compiled in various surgical textbooks, it does not appear that this instrument became popular or came into general use. The knife, the scissors, the ligature, with the various methods of application, in spite of the supposed dangers and inconveniences, continued to be the preferred methods of operation. Samuel Cooper, in his article on the tonsils in his Dictionary of Practical Surgery, 1809, after describing the various methods of operating, says: "I shall conclude this article with observing that the best modern practitioners in this country prefer a common knife to any other instrument, for the performance of this operation."

The period from 1827 to 1832 may be characterized as one in which a spirit of instrumental unrest arose as regards operations upon the tonsils. In 1827 Physick described his improvement of the wire loop operation. Smith[8] also described his apparatus, which, as he states, bore some resemblance to the snare described by Hildanus. It consisted of a ring of iron wire with a handle attached. On one side the ring was grooved, and perforations were made in the bottom of this groove on either side and in the handle through which a waxed linen thread was passed. The advantages he claimed were that the ligature could be more easily applied closer to the base of the tonsil and that it did not cause the inconvenience that Physick's double canula caused, as the latter of necessity must be left hanging out of the patient's mouth for some time.

Alexander Stevens[9] in this year also had presented a new canula for the tonsil operation, and it was evidently a matter of pride with him to make the claim that with his loop and canula the time necessary for the completion of the operation was shortened to twelve hours.

What with the pain and the discomfort entailed by the salivation and inability to swallow, and also the time required for the completion of the operation by the wire loop or ligature method, it must have required an excess of heroism with extreme fortitude to undergo such an ordeal. One can readily realize that the necessity must have been great before a patient would submit to the removal of the other tonsil.

Whether it was the technical difficulties of the operation, the discomfort to the patient, or whatever cause that impelled Physick[10] to look for a quicker method of operation, it is impossible to say. Although, as had been said, he credits the instrument of Bell as the one from which he developed his guillotine, the fact remains that he was quite familiar with Desault's surgical labors. This is shown by the fact that he had modified other instruments of this surgeon, and it seems probable that the idea of the application of an instrument of this kind to the tonsil was obtained from this source, while the instrument itself chosen to be modified was that used by Bell. Physick's paper directed attention to the possibilities of a quick and what was believed to be a safe operation, and from the various modifications suggested in the next few years, it evidently caused considerable thought to be devoted to the tonsil question on the part of the profession.

Dr. Physick writes: "In the operation for cutting off the uvula, Dr. Physick has, until very lately, used scissors; but being unable to complete the operation by one application of that instrument, several have been necessary to effect the division of the part. To obviate this difficulty, he determined to try the old instrument as modified and represented by Benjamin Bell in his System of Surgery. He found, however, that although he could divide with that instrument the greater part of the uvula, a portion of the membrane that covers the back part of it was not always divided, making the use of scissors necessary to cut it through. To remedy this inconvenience, he caused an instrument to be made having two plates instead of one, between which the knife was passed; but still the same difficulty was experienced in cutting through the membrane on its posterior part. He then thought of wrapping a strip of waxed linen over the semicircumference of the opening, to support the membrane until it should be divided by the knife. Thus constructed the instrument answered the purpose completely, and cut through the whole substance of the part in an instant. Dr. Physick has since used an instrument of similar construction for the removal of scirrhous tonsils. He finds it easy to cut off the whole, or any portion that may be necessary, of the enlarged tonsil in this manner. The operation can be finished in a moment's time. The pain is very little, and the hemorrhage so moderate that it has not required any attention in four cases in which he has lately performed it. The size of the perforated end of the two plates, and of course that of the knife, must be larger in the instrument for extirpation of the tonsils than in that for truncation of the uvula." (Fig. 5.)

The instrument of Dr. Physick is so well known that a reference to the plate will enable one to recognize the various parts. A comparison with the tonsillotome of Desault will show the same underlying basic principle, although in the mechanical details the difference is apparent.

Two months later Caleb S. Matthews[11] published a description of his tonsillotome. Although his name has been handed down to us in connection with the tonsillotome, it is probably due to the fact that it was confused with that of Mathieu, the instrument-maker, who devised an instrument on the lines laid down by Fahnestock. By comparing the original Matthews instrument with some that bear his name, even in recent surgical catalogues, it is difficult to see any resemblance. On account of its curious construction its description is given in full. (Fig. 6.)

In the same year William Gibson[12] also described another tonsil instrument. This can, perhaps, be best understood in his own words: "Having experienced more or less difficulty in the removal of enlarged tonsils, owing chiefly to the number of instruments, such as spoons, hooks, forceps, etc., required, it occurred to me that an instrument might be contrived that would answer the purpose of all those, by keeping down the tongue, holding the gland firmly, and separating it nearly at the same moment. Such I accordingly projected and ordered made, and upon trial found to answer my most sanguine expectations. * * * It consists of a pair of forceps nine inches long, an eighth of an inch broad when shut, with extremities an inch and a half long, slightly serrated and somewhat curved, including, when closed, an oval space a quarter of an inch wide, and terminating, at the other extremity, in handles which stand off obliquely from the shafts of the instrument. A knife or blade, the length and breadth of the forceps, rounded on its cutting edge, and having a button placed perpendicularly to its axis on the opposite extremity, works backwards and forwards by means of a groove, to the extent of an inch and upwards, between the blades of the forceps, to one of which it is secured by screws. A sheath upon each end of the forceps, to keep the knife from starting off the moment it touches the tumor, completes the instrument." (Fig. 7.)

Activity in the production of new instruments then ceased until the following year, when Cox[13] presented his contribution to the surgery of the tonsil. He states that in the methods of removal of the tonsils by ligature there is no danger of hemorrhage, but every modification of this plan is excessively painful. It may cause suffocation, particularly in cases where suffocation is threatened by the disease itself and the operation is most necessary. Other objections are that several days elapse before each tumor sloughs away and is removed from the throat. During the time that the putrefying mass occupies the fauces, an unhealthy and fetid fluid distills from it and is liable to pass into the stomach, particularly during sleep. It injures digestion. Another inconvenience is that the ligature, if made tight at once, is not capable of destroying the vitality of the whole mass. A considerable depth of surface is killed, but there remains in the center a projecting body which may cause future trouble.

The method by the knife is less painful, but danger of hemorrhage from the use of an unguarded bistoury in a vicinity so vast as the throat, agitated, too, during an operation by involuntary spasms, and where a ligature cannot be applied, is condemned by many of the profession, consequently the effort was made to make an instrument that would be under the proper guidance of the hand of the surgeon."

Another danger mentioned from the unguarded bistoury besides endangering the neighboring parts was that if the tumor had been seized with a hook, the whole gland would be likely to be extirpated and the main artery divided, producing copious hemorrhage. The advantages of the instrument are the ability to modify the motion of the knife in force and direction. His main objection to Matthews' instrument was that, although founded on correct surgical principles, it had never been tried out, consequently its defects were unknown. (Fig. 8.)

Description of the Instruments.—The apparatus consists of several oval rings of different sizes, all adapted to a common handle, and two knives; to each ring is soldered a silver stem of one inch in length, with a screw at its extremity by which it is attached to the handle. The stem and handle make an obtuse angle with the plane of the ring (Fig. A) and are thus prevented from interfering with the motion of the knife during the operation. On one face of the ring is a dove tailed groove, having the aperture widened near the stem (at C) to admit the beak of the knife, which slides easily along the groove, from which it cannot be extracted at any other part. The knives resemble each other, with the difference that the beaks are placed on the opposite slides of the blade. They are of the same length with the other instrument, viz., about seven inches. The handle and blade are of equal lengths; the cutting edge extends about an inch and a half from the point, and is concave. The beak (d) consists of a small piece of steel, of the shape of a pin's head, attached at right angles by a screw to the side of the end of the knife, and is adapted to move easily in the groove (c) on the face of the ring.

Directions for Performing the Operation.—In performing the operation the first object is to ascertain which ring will most exactly receive the tumor: this is to be screwed to the handle. The patient to be seated in a good light. The surgeon requires no spatula to depress the tongue. The ring may be used for this purpose until the tumor is seen. It should be then applied round it, taking care to keep the grooved face towards the cavity of the throat; then taking the knife whose beak is properly situated for the side on which he operates, the operator introduces the beak into the wide part of the groove (c). The knife should then be passed along the groove firmly upwards and onwards till it reach the opposite side of the ring, when its point must be pressed downwards, and thus round towards its starting place. The tumor falls into the mouth, and by a little adroitness may be brought out with the instruments.

D. L. Rogers[14] in 1831 presented an instrument on the order of those of Matthews and Cox. He made a similar claim to surgical principles on account of the bistoury being under the guidance of the hand. "To a common handle is attached a steel ring, of sufficient breadth to admit a groove on its inner surface, deeper at its junction with the handle, with an opening on its superior surface of a half inch in length, through which a common probe pointed bistoury possessing a curve equal to half the circumference of the ring is introduced. This bistoury is attached to the handle of ths instrument, fixed by a slide to a rivet, and supported on its place within the ring. To the end of the bistoury is attached a handle of sufficient size to give the operator complete control over it. The bistoury is pushed forward so that the knife is completely concealed in the ring. Then the ring is placed over the tonsil, the handle moved upward and pulled forward when it traverses the groove of the ring by dividing everything within its circumference."

In the same year J. K. Mitchell[15] published the first modification of the Physick guillotine. This consisted in attaching to the upper plate a spear pointed shaft which worked by means of a spring, with which the tonsil could be pulled out and held, thus preventing its falling into the throat after excision.

One other instrument remains to be mentioned. This is the one devised by Wm. B. Fahnestock.[16] His description reads: "This instrument, which I call a sector tonsillarum, consists of a piece of steel six inches long, and about one-fifth of an inch in thickness, neatly rounded and polished, with a small hole passing longitudinally through its center. One end terminates in a ring about one-eighth of an inch in thickness, and one inch in diameter. The ring is split or divided into two equal parts, which split or division extends one inch down the stem, for the passage of the knife hereafter to be described. There are two projections on the stem, one close to the ring, and the other about three inches below it, through which are small holes for the passage of the needle. The needle is about four inches in length, and works through the above named holes, on a flattened surface on the stem of the instrument. The knife consists of a flat steel ring, which fits in the split of the above named ring, with a stem of such dimensions as will pass through the longitudinal hole in the instrument. To the end of this stem is affixed the handle. This will be better understood by reference to the accompanying drawing, which represents the instrument one-third* the proper size. For the purpose of exhibiting the different parts, the circular knife is partly drawn down as in cutting, and the needle pushed up some distance." (Fig. 9.)

Of the various instruments described, only the types of those proposed by Physick and Fahnestock have come down to us. Innumerable modifications and improvements, real and otherwise, have been made in these instruments.

Of Physick's guillotine the best known is the one that was made by Mackenzie in the way of simplication and the use of a reversible handle. The latter, however, in recent times has been shown to be a needless accompaniment of the original instruments. With Fahnestock's instrument many more names are associated, chief among them being those of Guersant, Chassaignac, Charriere, Mathieu and Maissonneuve. These improvements have consisted chiefly in varying the form of the opening, the addition of extra prongs to the transfixing part of the apparatus, or changes in the handle. The swing of the tonsil operative pendulum has recently relegated instruments of the Fahnestock model to a secondary position, the Physick-Mackenzie type being in the ascendency. Of more than passing interest is the fact that the main principle of the tonsillotome as it appears today was evolved out of the mind of an untrained peasant before the middle of the seventeenth century.

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*In the sketch the instrument is shown somewhat larger for the sake of clearness.

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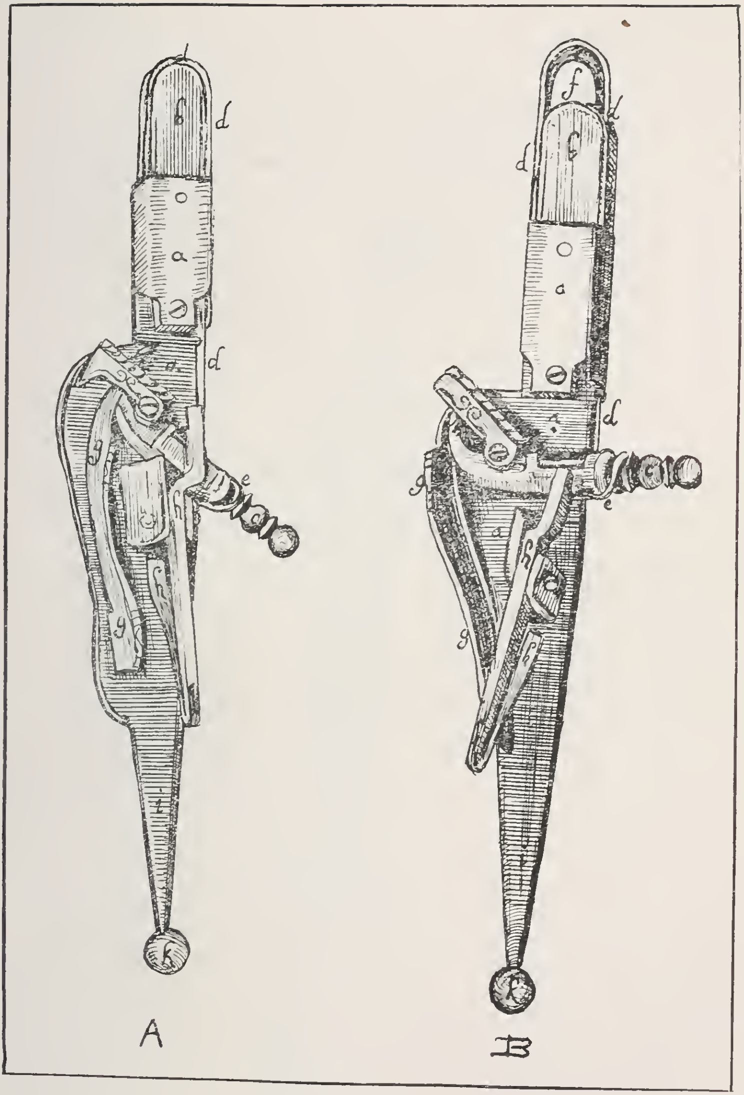

FIGURE 1.

a, a, a, a, a. Metal plate.
b, b. Rounded piece of wood.
c, c. Lever.
d, d, d, d, d, d, d. Metal band lying close around the plate and piece of wood.
e, e. Metal band attached to lever.
E. Curved and sharpened portion of the metal band.
f. Space between blade and piece of wood.
g, g, g, g. Hook No. 1, holding lever.
h, h, h, h, h, h. Hook No. 2, retracting lever.
i, i. Handle of instrument.
k, k. Round knob attached to end of handle.

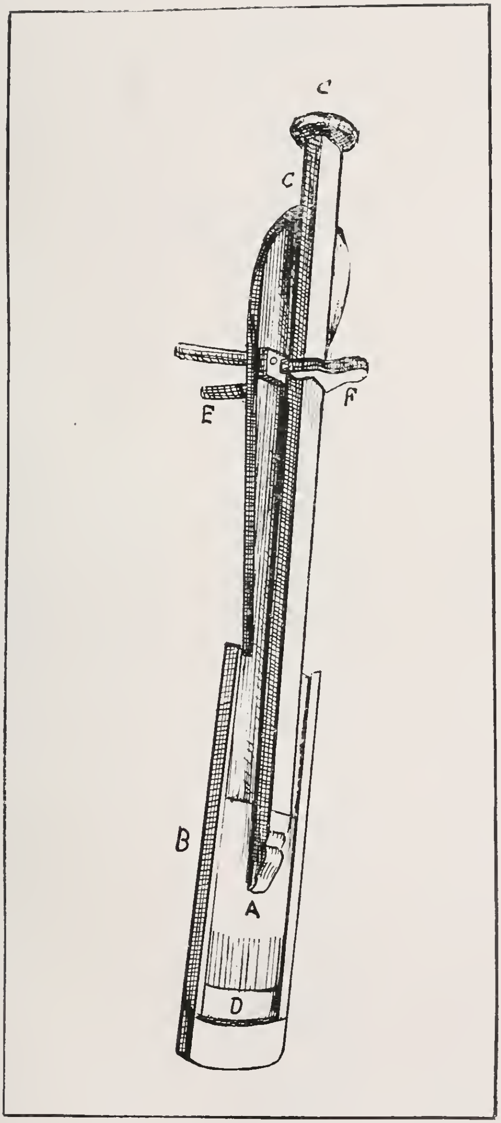

FIGURE 2.

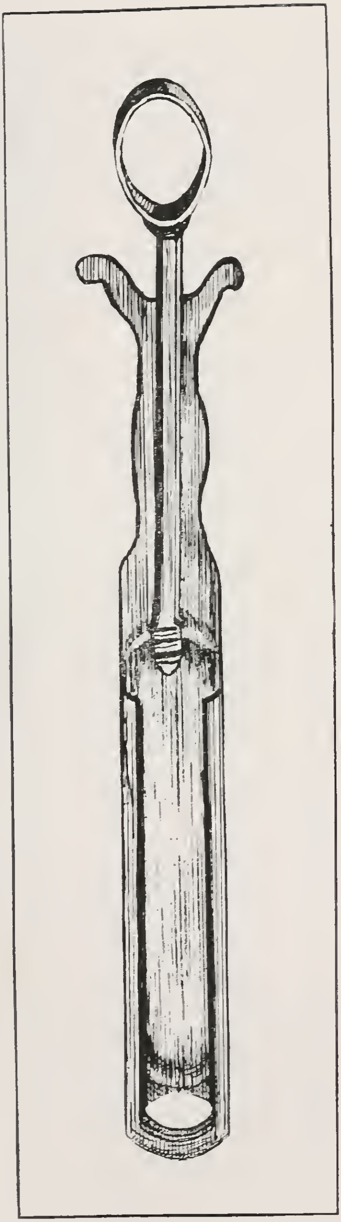

FIGURE 3.

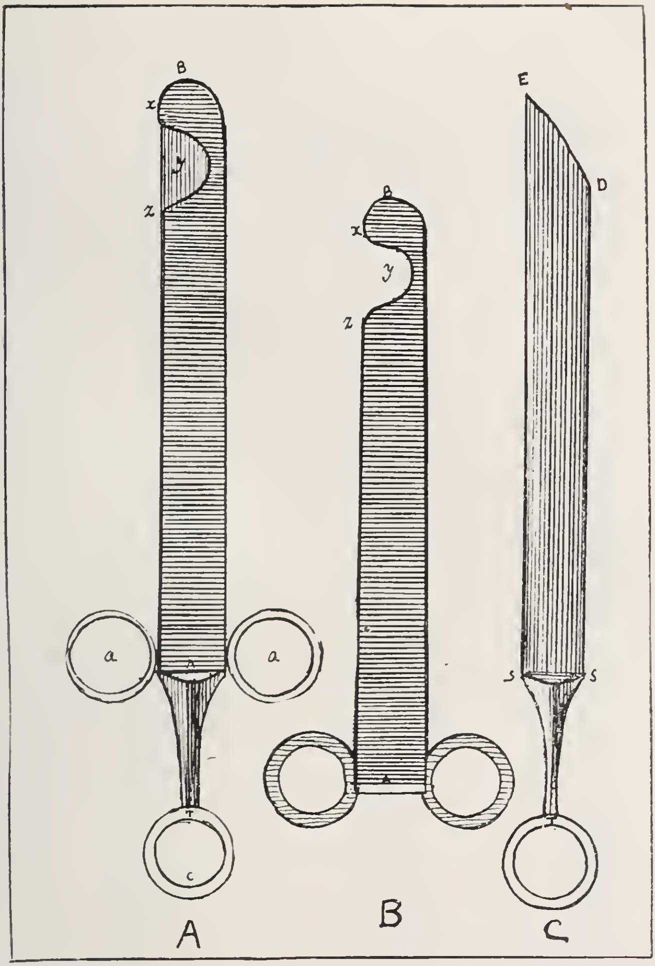

FIGURE 4.

Figure 4-A. Kiotome seen as a whole. A, B. Sheath of silver which receives the blade. a, a. Rings soldered to the sheath. y. Portion of the blade seen exposed in the notch. A, T, C. Plate of steel ending in a ring and serving as a handle to the blade. B, C. Total length of the instrument, 9 inches.

Figure 4-B. Sheath of the kiotome seen apart from the blade x, y, z. Semicircular noth, 9 lines in diameter. A, B. Total length of the blade, 6 inches, 4 lines: width near the rings, 6 lines; near the notch, 7 lines. B, x. Distance from the end to the notch, 7 lines.

Figure 4-C. Blade of the kiotome seen without the sheath. E, s, D, s. Dull sides of the blade, thinner than in the middle. D, E. Edge of the blade obliquely directed, 10 inches in length. s, s. Border serving to prevent the blade from entering too far into the sheath. E, s, s. Length of the blade, 18 lines. T, s, s. Plate of steel ending in a ring supporting the blade, of which the width is 7½ lines near the plate, 6 lines near the edge.

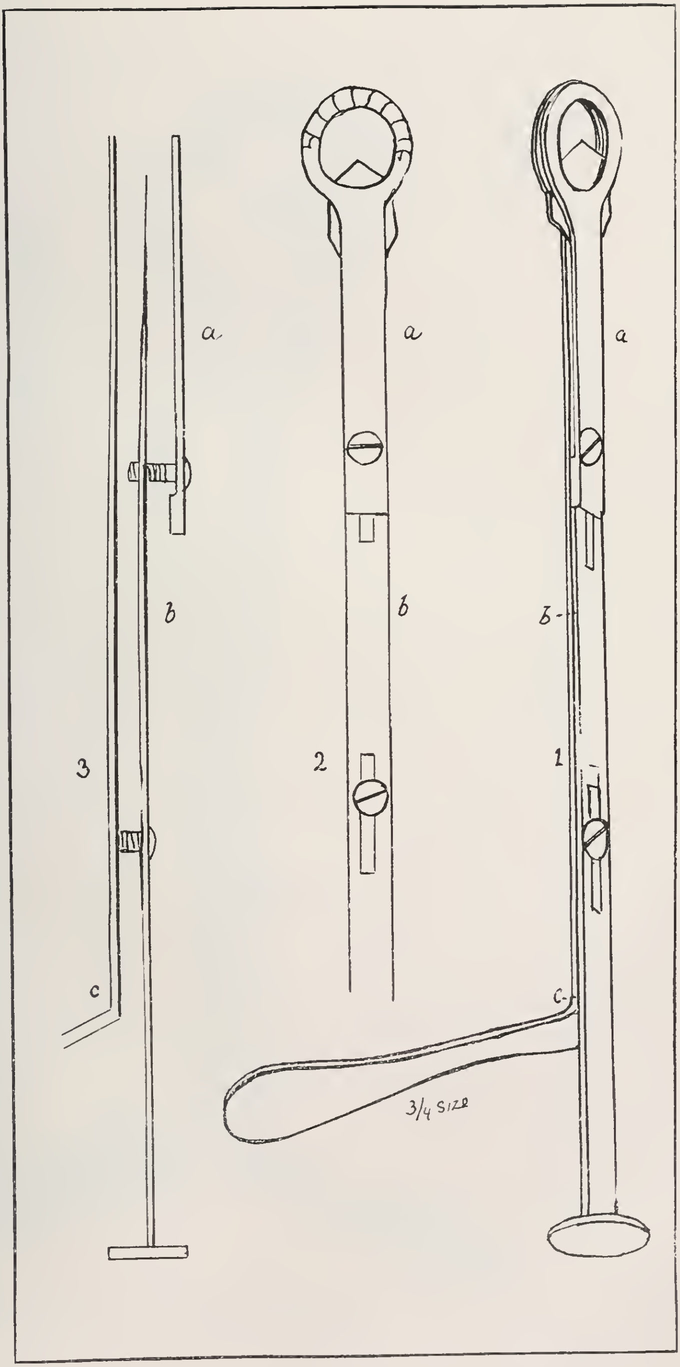

FIGURE 5.

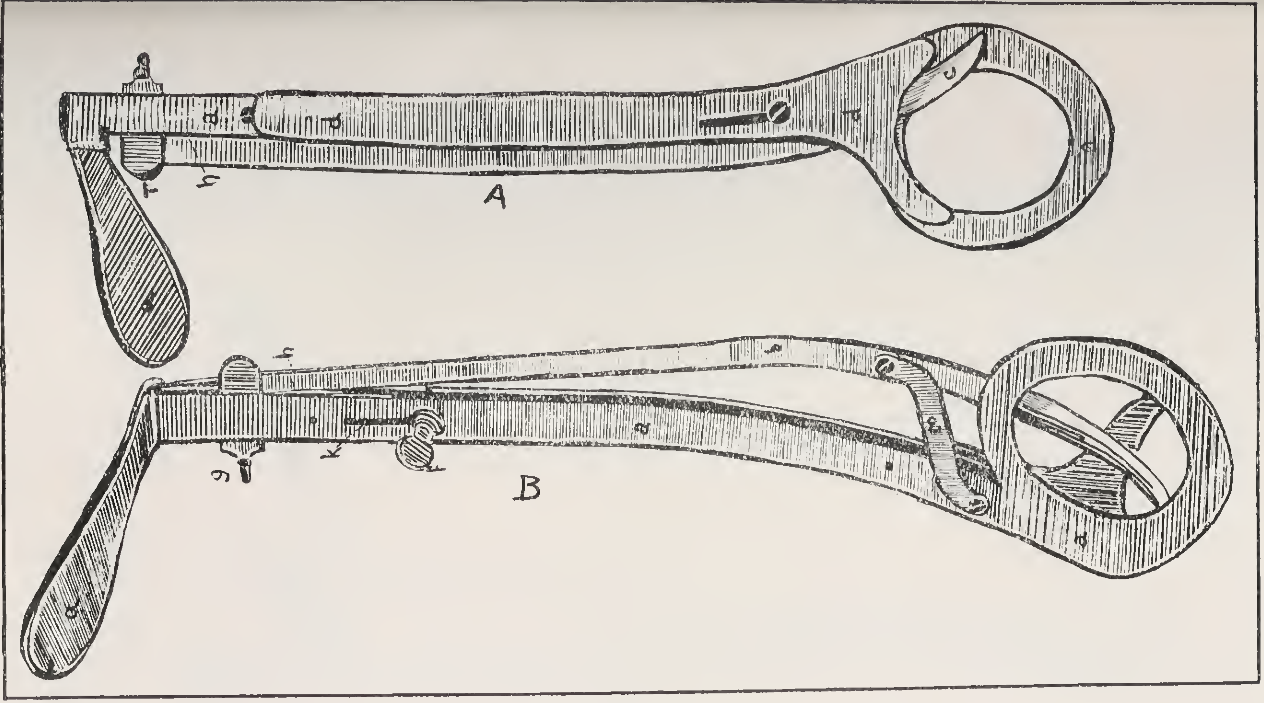

FIGURE 6.

Figures A and B represent the instrument nearly the proper size.

a, a, a. Is a staff having an oval ring at one end, and a handle bent at an obtuse angle at the other.

b. A scalpel the cutting part of which (c) is rather more than the longest diameter of the oval ring, and passes between the staff (a) and sliding plate (d).

d, d. A sliding plate designed to lessen the size of the ring, so as to adapt it to the uvula or to different sized tonsils.

e. An elbow attached at one end to the staff (a, a) and at the other to the scalpel (b), so as to admit of their separation at this extremity of the instrument, to such an extent as to permit the blade of the scalpel to pass entirely over the space included in the oval ring by which it is guarded.

f. The knob by means of which the sliding plate (d, d) is slipped backward and forward to the extent of the slits (k, k).

g. Another knob which slides in the slit (h) for the purpose of pushing forward the scalpel and producing the cutting motion as shown in Figure B. When this knob is drawn back, as in Figure A, the scalpel lays parallel to the staff on which it is placed.

i. The joint by means of which the scalpel is attached to the sliding knob (g) as a center of motion.

Figure A gives a view of one side, and Figure B of the other.

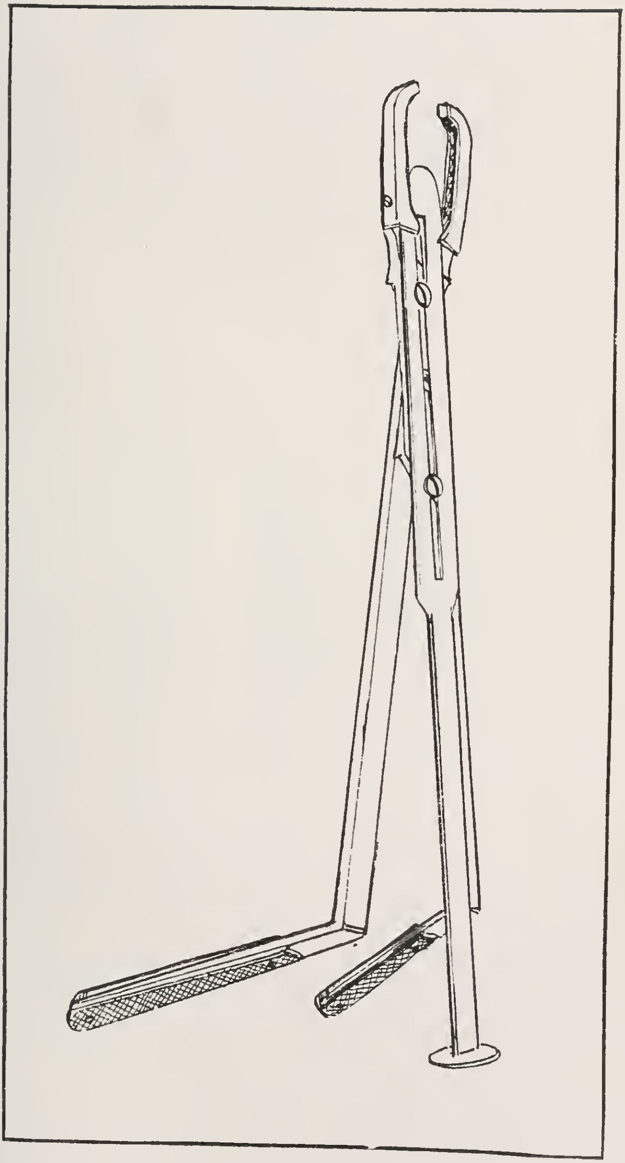

FIGURE 7.

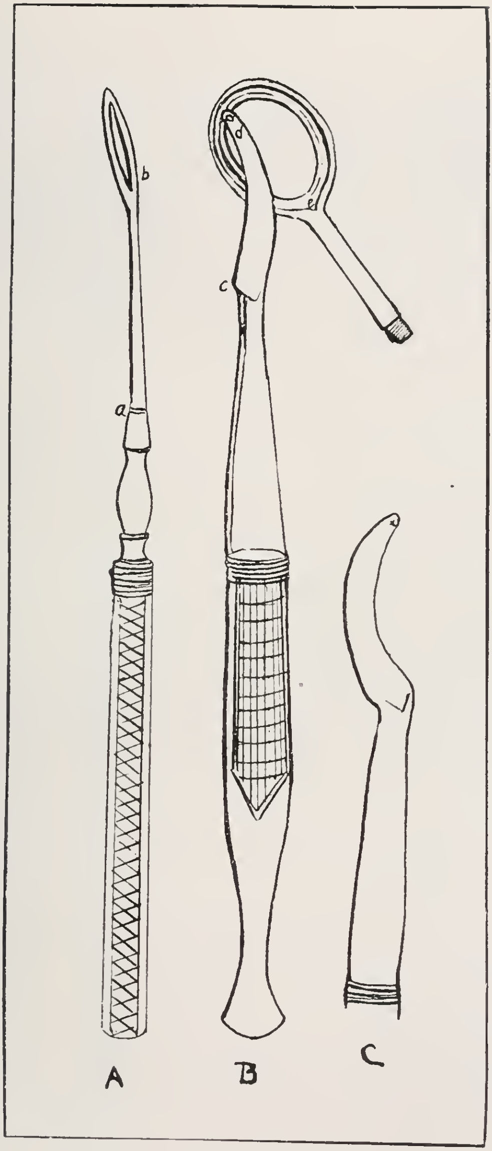

FIGURE 8.

Figure A. The instrument, by the ring at the end of which the tonsil is surrounded and held during the operation. a. The point at which the silver stem is screwed to the handle. b. The place where the silver stem is soldered to the ring at an obtuse angle.

Figure B. The tonsil knife for the left side. c. The termination of the cutting edge, which is concave to the point. d. The beak adapted to the groove on the face of the ring. e. The groove which conducts the beak of the knife around the tonsil. It is here a little widened to receive the beak.

Figure C. A convex edged knife (on some accounts not so good as the other).

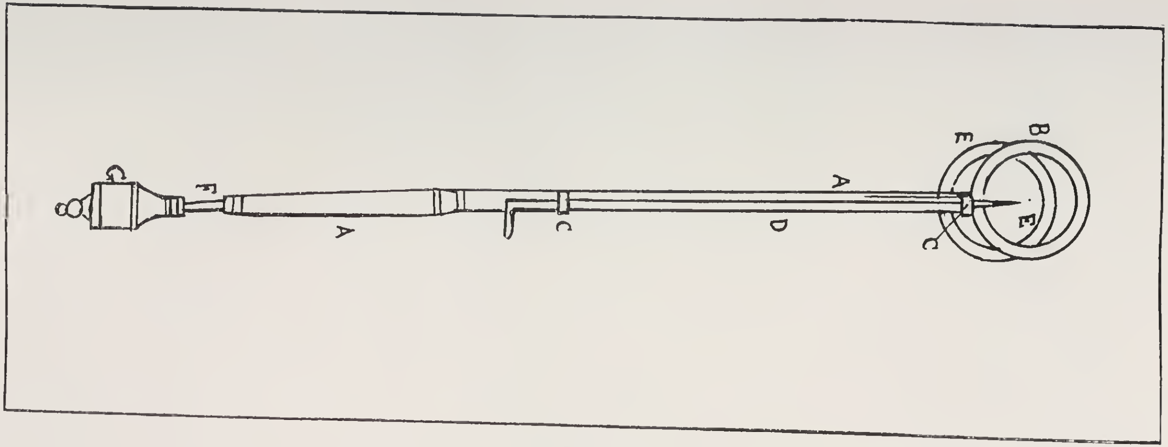

FIGURE 9.

A. A. The stem of the sector. B. The ring. C, C. The projections on the stem, through which are holes for the passage of the needle. D. The needle. E, E. The circular knife; the internal and upper half of which is sharp. F. The stem of the circular knife, to which is affixed the handle. G. The handle.

Mode of operating with the sector tonsillarum.—If it be the left tonsil that is to be removed, depress the tongue with the forefinger of the left hand; introduce the sector, pass it over the tongue, with the needle side upwards, and as the tonsil is approached, so turn it that the needle looks towards the right side of the mouth. Apply the ring over the tonsil, and with the thumb or forefinger of the left hand pass the needle through the base of the gland. Now incline the stem of the sector a little towards the right side of the mouth, or in a line with the angle of the jaw, and excise. When the right gland is to be removed, the mode of operation is reversed.

XXVI.

CHRONIC INFLUENZA OF THE NOSE AND THROAT.*

By Lorenzo B. Lockard, M. D.,

Denver.

At various times cases have been recorded in which influenza bacilli, either in pure culture or in symbiosis, have been found during a period of several months, and in some instances for as long as one and two years.

Usually these have been cases of chronic bronchitis, pneumonia or tuberculosis, although a few have concerned individuals with rhinitis and otitis media.

The patient whose history I herewith record presents the unique spectacle of an infection of the nose and throat lasting twelve years, during all of which time cultures of the bacillus influenzæ have been obtainable whenever sought for, whether or not subjective symptoms of the disease were present.

The chronicity of this case, its various clinical manifestations, and resistance to all surgical and medicinal procedures, together with the conjectural field it offers concerning recurrent attacks of tonsillitis, quinsy, coryza and sinusitis, make it well worthy of report.

HISTORY.

The patient, when he first came under my observation because of a peritonsillar abscess, was thirty-five years of age.

For ten days after evacuation of the pus there was severe prostration, greatly exceeding that which one commonly sees in this condition.

Unfortunately a bacteriologic examination was not made, for it was not until later that its importance became manifest through the obtaining of the following history:

In 1902, seven years before the attack in question, while serving as an interne in the Presbyterian Hospital of New

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*Read before the American Laryngological Association, May 25, 1914.

York, he suffered from a severe attack of influenza, which terminated, after seven weeks, in a peritonsillar abscess.

An examination of the pus, made by the hospital pathologist, Dr. Geo. A. Tuttle, showed a pure culture of the bacillus influenzæ. In the succeeding two years, three examinations of secretions from the crypts of the tonsils gave similar findings. One of these was made during an attack of follicular tonsillitis; the others while he was in apparently normal health.

Previous to the original attack he had been moderately robust; from then on he was constantly subject to more or less severe attacks of coryza, pharyngitis, tonsillitis and quinsy, each being characterized by socalled grippal symptoms.

In the course of seven years he had twelve peritonsillar abscesses, involving sometimes one, at other times both tonsils, and an unknown number of attacks of follicular tonsillitis. In 1904 he contracted pulmonary tuberculosis, which disappeared after one year's residence in the West.

Four months after the attack which first brought him under my observation, he had a severe bilateral follicular tonsillitis, accompanied by a vesicular eruption on the velum palati, the vesicles resembling small grains of sago. During this seizure, also, the constitutional symptoms were out of all proportion to the amount of local involvement.

This bore a striking resemblance to the cases of pharyngeal influenza described by Escat.[1]

In the following November his tonsils were removed, and three days afterward a false membrane, similar in appearance to a mucosa cauterized by silver nitrate, appeared upon the palate and rapidly spread until the pillars on both sides, the uvula and posterior pharynx were completely covered.

This membrane, despite vigorous antiseptic treatment, persisted for ten days, and gave pure cultures of the bacillus influenzæ. During the entire period of convalescence there was marked prostration with severe pain in the joints, head and back, with a temperature that ranged from 100° to 103°. A second examination of this membrane, after seven days, again showed the influenza bacillus.

In the succeeding two months three cultures from throat swabs were made by Dr. Henry S. Denison, all with similar findings.

Thorough cleansing of the pharynx and tonsils immediately before the cultures were taken, with alkalin washes, hydrogen peroxid, argyrol, and iodin, had no appreciable effect in diminishing the number of bacilli.

An autogenous influenza vaccine was administered at this time. Because of his great susceptibility it was found necessary to begin with a dose of only 1,000,000, which was gradually increased, but tolerance could not be gained for more than 10,000,000. According to Allen,[2] this dosage is entirely inadequate. He recommends 50,000,000 as an initial dose in acute cases, and claims no result can be anticipated in chronic ones until from 2,000 to 5,000 million are given.

Even with the small dose given in this case there was always some reaction; two to three degrees of temperature and rather severe joint pains and general prostration for from forty-eight to sixty hours.

No influence whatever was observable upon the attacks of coryza from which he frequently suffered, and although positive cultures from the throat were always obtainable, he had no additional attacks of pharyngitis.

In April, 1912, he contracted typhoid fever, and on the twelfth day developed a severe maxillary sinusitis. Until this time there had never been any symptoms referable to the nose, aside from the recurring attacks of acute coryza. The nose was cleansed and a straight trocar used for perforation of the antrum, through which a platinum needle was passed, thus making it reasonably certain that outside contamination was avoided.

A pure culture of the bacillus influenzæ was obtained. The antrum rapidly healed. Ten days later a small alveolar abscess appeared over the second bicuspid; as the tooth was alive and the skiagram did not show necrosis, and all symptoms disappeared, no special treatment beyond incision was indicated. An examination of the pus could not be made.

Six months later, while in otherwise normal health, there was a recurrence of the antral suppuration and again the influenza bacillus was obtained, this time in symbiosis with the streptococcus: spirilla and fusiform bacilli were also found. This examination was made by another pathologist, Dr. Roscoe Baker, of Denver.

All subjective symptoms disappeared after a few irrigations, and a skiagram showed nothing abnormal.

At this time he went to Southern California for the winter, and while there a third attack developed. A month later a permanent nasal opening was made by Dr. S. McCuen Smith of Philadelphia, and considerable pus evacuated.

An examination of the pus was not made at the time of operation, but three weeks later a negative swab was taken. There was marked improvement in the general health, and the antrum remained quiescent until the first week in July, three months after the operation, when suppuration occurred, accompanied by prostration, malaise and slight temperature, 99 to 99.5 degrees in the afternoon.

An examination by Dr. Baker showed the influenza bacillus in large numbers, in connection with the staphylococcus.

Again a very small alveolar abscess appeared over the second bicuspid, and a skiagram showed necrosis of the alveolus about the second bicuspid and first molar and extending to the floor of the antrum.

On July 28, 1913, these two teeth were extracted, and the necrosed portion of the alveolus and antral floor resected.

A culture taken from the extracted molar, at the bifurcation, showed influenza bacilli and staphylococci.

The opening was so large that three months elapsed before it was thought advisable to adjust a permanent plate and drainage tube.

On January 30, 1914, five months after the excision of the floor of the antrum, there was still a slight discharge. Cultures from this showed influenza bacilli in greatly reduced numbers and staphylococci.

A thorough search of the literature fails to reveal an analogous case, although an amazing number have been recorded with chronic infection of the lungs and bronchi.

A study of this case leads to a consideration of the following points:

1. The prevalence of influenzæ bacilli in nonepidemic periods.
    (a) In the secretions of normal individuals.
    (b) In the secretions of patients suffering from other diseases.
2. The frequency of chronic influenza.
    (c) Of the lungs and bronchi.
    (d) Of the nose and throat.
3. Influenza carriers: their role in the causation of sporadic cases and of recurring attacks in the individual.

I.—PREVALENCE OF BACILLI IN NONEPIDEMIC PERIODS.

The ubiquity of the influenza bacillus is much greater than commonly supposed.

(a) B. Scheller[3] examined the secretions from the throats of one hundred and nine normal persons and found the bacillus influenzæ in twenty-five, fifteen of whom gave a history of at least one attack of grip.

Holt,[4] in an examination of forty-three healthy persons, had sixteen positive and twenty-eight negative cultures.

Two of twenty throat swabs taken from normal persons by Davis [5] [6] were positive.

Thus in a total of one hundred and seventy-two normal individuals, the bacillus was found forty-three times, or in 25 per cent.

(b) In patients suffering from other diseases, and not known to have influenza, the bacilli are found in a large percentage.

Wollstein,[7] by swabbing the throat, recovered the bacillus in sixteen of thirty-seven cases of pneumonia; in eleven of thirty-four cases of bronchitis; in eight of eighteen cases of measles; in eight of sixteen cases of tuberculosis, and five times in sixty-five cases of other diseases.

Lord,[8] during nonepidemic periods, in examining cases of what were presumably ordinary coughs, found influenza bacilli in sixty out of one hundred cases. In twenty-nine of these they were present in overwhelming numbers.

Dr. L. Emmett Holt[1] had cultures taken of the throats of all the inmates of the Babies' Hospital in New York, including nurses and resident physicians, to determine what value could be attached to throat cultures as a means of diagnosis, and to ascertain the responsibility of influenza for the frequency with which respiratory infections occur in hospitals.

One hundred and ninety-eight persons were examined:

Suspected cases	42
Nonsuspected cases	43
Cultures positive	85
Suspected cases	16
Nonsuspected cases	97
Cultures negative	113

A summary of these cases, with those reported by Scheller,[3] Davis,[5] Allen,[6] Boggs,[9] and Grassberger, show that out of four hundred and twenty-seven patients, two hundred and fifteen, or 50 per cent, harbored the organism of influenza.

II.—CHRONIC INFLUENZA.

Whether or not chronic influenza is to be considered a common disease depends upon whether the presence of the Pfeiffer bacillus is regarded as essential to a diagnosis. By a majority of the authors the clinical symptoms, even without bacteriologic confirmation, are deemed sufficiently characteristic to be conclusive.

(c) These chronic infections are usually of the lungs and bronchi, although in a small number the nose and throat seem to play the predominant role. The usual period during which the bacilli are present in the sputum following an acute attack cannot be definitely stated. In typical cases they are present only for a few days and disappear with the disappearance of the purulent secretions.

Leichtenstern[10] says: "Certain bacteriologic investigations make it likely that the germs in convalescence may remain in an attenuated form perhaps fourteen days or longer in the various cavities, and later on again become virulent." He observed two patients in whom they persisted to the time of death, two years after the acute attack.

Osler[11] has seen three cases in which influenza bacilli persisted in the sputum for two and one-half years, and Ortner[12] reports six similar cases, four of which lasted respectively three, four, five and nine years.

Innumerable cases similar to the foregoing could be cited.

(d) Proved cases of chronic nasal and pharyngeal infection are rare.

As with general influenza, a chronic infection of this type may be assumed in the presence of certain clinical symptoms, such as those described in detail by Goodale[13] and Frank,[14] but those in which bacteriologic substantiation has been given are extremely rare.

Granby[15] has described a case of purulent rhinitis of four years' duration, in which influenza bacilli were found.

Cultures of influenza were obtained from the nasal secretions of two chronic cases observed by Lord. In each case the nose was examined by Dr. A. Coolidge, Jr.; in one there was atrophic rhinitis, in the other a chronic purulent rhinitis. The influenza bacilli, in both instances, were associated with pneumococci and pyogenic cocci.

Lindenthal[16] reports the only two cases of chronic sinusitis, bacteriologically proved, that I have been able to find, and in neither instance is the duration of the suppuration known. His description, however, implies that they are both of long standing.

In one case an autopsy was held upon a patient dead of some chronic disease. The frontal cells and right antrum were filled with pus which gave a pure culture of the bacillus influenzæ.

The second autopsy was upon a patient dead of croupous pneumonia, who had had a cough and expectoration for one year. Influenza bacilli were found in the lungs. The right antrum and sphenoid were filled with pus: that from the sphenoid showed influenza bacilli, pneumococci, and staphylococci: the antral pus contained only diplococci. A case of chronic influenzal sinusitis of at least four and possibly twenty-three years' duration, has been observed by my colleague, Dr. Roscoe Baker.

This patient, although a physician, has refused to submit to either a rhinologic or X-ray examination, hence the diagnosis must rest upon the subjective symptoms and bacteriologic examinations. These, however, are so definite as to warrant report.

In 1891 he had a severe attack of influenza, accompanied by symptoms of maxillary sinusitis. One year later pain developed in the right cheek, with considerable swelling below the eye and a copious purulent discharge from the corresponding nostril. There was gradual improvement, and at the end of two weeks he had fully recovered.

Four years ago, while studying at the Polyclinic in Chicago, there was a recurrence of these symptoms, and an examination of the pus, made by himself, revealed the influenza bacillus. His findings were verified by Drs. Rosenow and Murphy. He was given an autogenous vaccine with some benefit, but the discharge has since persisted and amounts to about one-half an ounce daily.

On July 15, 1912, this pus was examined by Dr. Baker, who found influenza bacilli and the staphylococcus albus and aureus.

In February of the present year the influenza bacilli were still present, associated with the staphylococcus mucosus.

In subacute cases the bacilli in pure culture have been found in a few instances.

Lindenthal has had two such cases: one of three weeks' duration, and one in which the exact duration was unknown. In several additional subacute cases he found the influenza bacillus in symbiosis with bacillus coli communis.

In acute cases they have often been found, but not as frequently in recent years as during earlier epidemics.

According to Hajek,[23] the influenza bacillus is the most frequent cause of sinus inflammation, and Zarnico[24] places it after the pneumococcus and streptococcus in the order of their relative frequency in the causation of suppuration.

Weichselbaum[25] claims that the sinuses are always affected during attacks of acute influenza, and Lindenthal demonstrated bacilli in the antral secretions in all of seven acute cases which he examined postmortem.

In these cases as well as in influenza otitis there has been a steady microbic evolution. Primarily the bacillus influenzæ was often found in pure culture: later it appeared in conjunction with the micrococcus catarrhalis, both organisms occurring in the same patient, or one in one and one in another. Today the micrococcus catarrhalis is the one usually found, and the bacillus influenzæ only rarely.

Manwaring-White,[17] in an epidemic in 1909, did not once find the Pfeiffer bacillus in sinus cases, but in every one the micrococcus catarrhalis was present.

Today the majority of sinus cases following what clinically is the grip do not show the influenza bacillus, but the micrococcus catarrhalis, pneumococcus and streptococcus.

The same is true regarding acute otitis. As early as 1892 Scheibe[18] demonstrated the bacillus in the aural discharge, but today it is rarely found.

Holt made cultures of twenty-nine cases of acute otitis after paracentesis and did not find influenza bacilli in one, yet fifteen of these patients gave positive throat cultures. In eighty-five persons giving influenza cultures, there were seventeen cases of acute otitis, yet bacilli were not once found in the aural discharge.

These results seem to show that in general the relation of influenza to these conditions is the same as that which obtains in measles: the general infection furnishes the proper conditions for the development of other organisms already present.

These facts make clear the reason for the extreme rarity of chronic infections of the sinuses with demonstrable influenza bacilli, although the original cause of the infection may have been an undoubted influenza.

III.—PRACTICAL BEARING OF QUESTIONS CONSIDERED.

The questions which have been considered have a strong practical bearing upon two little understood problems: the eruption of sporadic cases, and the frequent recurrence in certain individuals of local symptoms which may be clinically diagnosed as influenza, although unattended by constitutional manifestations.

It becomes almost certain, as we study the disease, that the explanation of its existence, during nonepidemic periods, is the same as that governing diphtheria, enteric fever, cholera, etc.; that there are influenza carriers, who, showing no symptoms of the disease, may carry and distribute the specific germs without necessarily falling victims to them themselves. Such patients, however, usually suffer from recurring attacks of rhinitis, tonsillitis or bronchitis, which at one time may apparently be idiopathic in origin, at another typically grippal.

The role of diphtheria carriers in the dissemination of that disease is now fully recognized, and we know that patients harboring the Klebs-Loeffler bacillus may remain well a long time and then fall victim to the disease; and the same is even more true of influenza, for influenza infections do not protect, but rather predispose to recurrences.

Park and Williams[19] upon this subject say: "Sporadic cases or the sudden eruption of epidemics in any localities from which the disease has been absent for a long time, may possibly be explained by assuming that the bacilli, as already mentioned, often remain latent in the lung or bronchial secretions for many months, and perhaps years, and then become active again, when under favorable circumstances they may be communicated to others."

Osler[11] voices this view as follows: "Some patients who have once suffered from influenza seem to be especially liable to recurrences, which may be due to the persistence of the bacilli, undetected, in the upper parts of the respiratory tract, causing autoreinfection.

"In interepidemic periods the respiratory infection with influenza bacilli cannot be distinguished from infections with other organisms, such as micrococcus catarrhalis, without a bacteriologic examination."

Jordan[21] writes: "Influenza sometimes exists in a chronic form, in which the bacilli appear in the nose and throat secretions for months. The microorganism is also found in a considerable portion of healthy persons. Its presence and persistence in the nasal and bronchial secretions of convalescents and chronic cases, in the sputum of consumptives, and even in the mouth and nose of healthy persons who have been in contact with influenza patients, affords a ready and plausible explanation of many of the phenomena of distribution and transmission."

Madison[21] reports a case that shows the danger of infection being transmitted in this way. A woman suffered for twenty-two years with a cough, and during a period of twenty years had recurrent hemorrhages. The daily expectoration was between six and eight ounces. No tubercle bacilli were found, and the Moro tuberculin test was negative, but the bacillus influenzæ was present in almost pure culture.

The father and mother, and all of her seven brothers and sisters, contracted chronic bronchitis, as well as four of her ten children. An additional child died at nineteen months from some respiratory disease.

Positive evidence is lacking that these respiratory conditions were all influenzal in origin, but there are strong reasons for believing them to have been so.

Outside the body the bacilli are of short life. In hemoglobin cultures they remain alive for as long as seventeen days: in blood bouillon cultures at 20° C., they retain their vitality only for from two to three weeks.

Neisser[22] was one of the first to show that this vitality is greatly increased by association with other organisms.

He has demonstrated that the best "nurse" is the bacillus prodigiosus, and succeeded in keeping the influenza bacillus alive for twenty generations, when the two were grown symbiotically.

There are reasons for thinking that killed cultures of streptococci may increase the virulence of the bacillus for animals. He concludes: "If this proves true, it opens up an interesting field for speculation as to the origin of the epidemics of influenza, suggesting that Pfeiffer's bacillus may live possibly for long periods as a harmless saprophyte in conjunction with other bacteria, and be suddenly raised in virulence as a result of its entrance into the body in conjunction with the streptococcus or some other pathogenic bacteria."

Their frequent discovery in normal throats, and the warranted supposition that they remain latent in the sinuses for long periods of time, indicates, as pointed out by Davis, that they may exist as organisms with a potential pathogenic function awaiting an opportunity favorable for development.

This favorable opportunity develops under certain climatic and bodily conditions, when, owing to lowered resistance, or the accidental entrance of other organisms, the bacilli increase in number and virulence, and become capable of transferring the disease to others, or of producing symptoms in the individual who has previously harbored them with impunity. The case cited by the author gives considerable weight to this view.

TREATMENT.

No treatment, aside from that which depends upon raising the resistance of the individual, has been effective. Vaccines have been largely unsuccessful. Only a few cases have been reported in which any effect whatsoever has been observed.

Fisher[26] reports one case successfully treated with an autogenous vaccine made from the influenza bacillus and the pneumococcus, and Granby, in the case of chronic rhinitis previously referred to, noted great improvement from a vaccine, but a complete cure was not obtained.

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XXVII.

A STUDY OF VINCENT'S ANGINA.

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Vincent's angina is an inflammatory membranous process, deepening into ulcerous, and sometimes gangrenous, manifestations in the mouth, tonsils, pharynx, and, more rarely, in the larynx or trachea. It is caused by the fusiform bacillus and spirillum bearing Vincent's name.

Various names have been given the affection by different writers, such as "ulcerative angina and stomatitis," "ulcerous angina," "ulceromembranous angina," "spirocheten-bacillen angina," and "diphtheroid angina."

As far back as 1879 F. Y. Clark[1] described a bacillus, curved and motile, which may have been the fusiform bacillus. He is quoted by Miller,[2] of Berlin, who four years later, in 1883, wrote on bacteria of the mouth and described the fusiform bacillus and the spirochete. The bacillus Miller considered a spirillum, calling it spirillum sputegenum, and the spirillum he identified with the spirochete dentium. In the same year Lingard and Batt[3] described an affection of the tongue and mucous membrane in calves strongly resembling Vincent's angina, and later Lingard[4] found a bacillus forming long threads in calves, in monkeys, in horses with gangrenous pneumonia, and in man. By some, precedence in reporting the disease is given to Rauchfuss,[64] who in 1893, in a report of patients in a children's hospital in St. Petersburg, described the bacteriology in certain cases of ulceromembranous angina, and published photographs of the bacilli and the spirilla now identified with Vincent's angina. The following year Plaut[5] described the same organisms in ulcerous angina, and about the same time Conheim published his findings along this line. In 1896 Vincent[6] published a full description of the fusiform bacilli and the spirilla in hospital gangrene, and called attention to the presence of them in certain ulcerative anginas. Bernheim[7] in 1897 made a report of thirty cases with the organisms present, though uncertain of their etiologic influence. In 1898 Vincent[8] published a report of fourteen cases. In 1899 Freyche[9] published a study of the diphtheroid and ulcerous angina of Vincent, and in the same year Fotiadès[10] published an article on stomatitis and angina with evidence of the fusiform bacillus of Vincent. Athanasiù[11] in 1900 published a paper on ulceromembranous angina with the fusiform bacilli of Vincent. In 1901 Nicolet and Marotte,[12] in an exhaustive report with references to sixty articles, described the morphology of Vincent's organisms. In 1902 Mayer[13] described a case, and in 1903 Fisher described two cases. In the latter year Auchi[14] discussed the distinctive influence of the disease, and in the same year Conrad[15] made a thorough review of previous artcles. Ten years had passed since Rauchfuss made his report in the St. Petersburg hospital, and twenty since Miller published his studies and referred to a previous finding by Clark. During this period many foreign writers had taken up the subject, but American writers had given it scant attention. Vincent,[16] writing in 1905 on the symptomatology and diagnosis, referred to more than eighty articles, but only two of them were by Americans. As evidence of the lack of attention to the disease in this country, Crandall's report[17] in 1904, of what he assumed to be the third case in the United States, may be noted, the first case reported in the United States being that of Emil Mayer,[13] of New York, in 1902, to which reference has already been made. More recently, however, numerous articles by American writers have been published, and knowledge of the disease in this country is becoming more general.

ETIOLOGY.

The conditions in which the patient lives contribute much to causation. Though one finds cases among those whose sanitary surroundings are beyond criticism, by far the greater number are among those whose surroundings or whose work are of an unsanitary nature. The disease[18] is more common in malnutrates, and it frequently follows measles, scarlet fever, whooping cough, and diphtheria. Halsted[19] emphasizes an error in not recognizing the deep and, at times, gangrenous ulcerations of the tonsil and mouth in late stages of diphtheria and scarlet fever as due to Vincent's organisms rather than to the Klebs-Loeffler bacillus and the streptococcus of the original infection. That is, he regards the deep, necrosing ulcerations as caused not by the original germs, but by the fusiform bacillus and the spirochetes producing a secondary infection. With reference to the organisms becoming active after measles, O. N. Bryan[20] says that a physician told him of a case of measles that had entirely recovered with the exception, when dismissed, of a white patch on the mucous membrane of the mouth, which soon developed into noma.

Other affections[21] that may precede and help to produce Vincent's angina are dental caries or abundant tartar on the teeth, alveolar abscess, mercurial stomatitis, lymphoid tendencies, enlarged and necrotic tonsils, syphilis, trauma after tonsillectomy, inflamed gums, irritative lesions in the mouth, eruption of a wisdom tooth and of the second teeth in children, and some think adenoids predispose to the disease. Griswold[22] describes a case in which the patient cut her wisdom teeth during the attack, and, owing to facial pain, was twice sent to the dentist. The use or abuse of tobacco are said to aid in the development of the disease. Oral uncleanliness[18] and bad conditions of the teeth are important causative factors. The organisms[19] are not apt to produce disease unless the teeth, mucous membrane, or tonsils are in an unhealthy condition, or unless the general health is bad. Place[23] believes the disease preventable by proper care of the mouth, teeth, and general health, and says that Vincent's angina should become as unknown as hospital gangrene or typhus fever. G. Hudson-Makuen[24] recognizes the danger of infection of the teeth from the tonsils as well as of the tonsils from the teeth, and advises the total extirpation of diseased tonsils.

The first appearance of the disease may be an ulceration on the gums and on the inner side of the cheek. Sutter[21] describes one case in which the lesion was confined entirely to an ulcerated mucous membrane on a level with the last molar tooth. The pain was that of toothache.

The principal etiologic factors, of course, are the characteristic organisms plus the conditions that harbor them.

PREVALENCE.

Undoubtedly a large number of cases go unrecognized, owing to the fact that the clinical diagnosis is most unreliable, and the further fact that bacteriologic tests have been largely confined to cultures. Often the clinical report is diphtheria, when the Klebs-Loeffler bacillus is entirely absent. As often, perhaps, the laboratory report is negative in cases in which direct smears show the pathogenic organisms.

Some consider the disease rare. According to Rolleston,[25] only ninety-five cases, or 0.5 per cent, of 18,187 admitted to the Metropolitan Asylums Board Hospital, London, during 1905-7, as suspected diphtheria, were Vincent's angina. At the Grove Hospital of Contagious Diseases Vincent's was present in only 0.9 per cent of all membranous anginas, and in only 4.9 per cent of the nondiphtheritic cases, while A. Meyer, out of 15,000 cases of ear and throat disease at Heymann's Clinic in Berlin, saw but thirty cases. Vincent has found his angina in only 2.2 per cent of all cases. Many, however, report it as forming a large per cent of all anginas. Rodela found the organisms in 33⅓ per cent of 2,000 cases of pseudomembranous angina; Beitzke in 8 per cent of fifty-eight cases of suspected diphtheria; Lublowitz in 15 per cent of thirty-eight cases of ulcerative affections of the mouth; Arnold in 60 per cent of a small number of cases of follicular tonsillitis; Chamberlain[26] concludes that more than 50 per cent of the throat and mouth ulcers occurring in the Philippines show the fusiform bacilli and the spirochetæ in greater or less numbers, and that 33⅓ per cent show them in predominating numbers; Koplik[27] says Vincent's organisms are always found in gangrenous processes of the mouth among those who are examined in the Mt. Sinai Hospital, in New York; in 1904 Escherich[27] proved that in the large hospitals of New York, London, Paris, and Berlin 40 per cent of the diphtheroid diseases were the various anginas, Vincent's no doubt carrying a large proportion of these, though he does not give the per cent; Bluhdorn has found one or the other or both organisms of Vincent in 64 per cent of 222 cases of diphtheria; in 73 per cent of cases of scarlet fever; in 50 per cent of cases of streptococcus or staphylococcus sore throats; in 50 per cent of cases of ulcerative stomatitis; in 67 per cent of thirty-one cases of syphilitic mouth or throat lesions, and in 58 per cent of forty-three healthy persons.

The usual age of attack is between two and twenty-five years. The greater number of cases appear to be among young adult males and children out of their teens. The disease[18] is common among institutional children and rarer in private practice. The occurrence is more frequent in the spring, early summer, and fall, though not confined to any season. Damp weather has an apparent influence upon the frequency of occurrence.

CONTAGION.

In a number[27] of instances the disease has been reported transmissible, the characteristic organisms appearing in those intimately subjected to the contagion. Vincent, Bernard, Auger, Dopter, Sutter, Green, Chamberlain, Arrowsmith, Holm, and others have reported contagion. It is, however, as stated, dependent upon close contact, such as the common use of eating and drinking vessels, pipes, pencils, etc., or possibly to carelessness in attention to dental or surgical instruments. Chamberlain[26] reports a case of hand infection due to a bite by an infected person. Hultgen[27] reports a case of hand infection in which a patient with Vincent's angina had the habit of biting his nails. Baron,[27] of Dresden, shows contagion in four out of thirty-five cases, and Todd,[27] of Minneapolis, reports the case of a pathologist who contracted the disease during an epidemic in an insane asylum. The pathologist harbored the organisms and had severe exacerbations. Several epidemics have been reported, one in which contagion was due to the common use of a tobacco bag, each smoker drawings the strings together with his teeth. Green[18] reports a number of cases with recurrence in one, all due to the matron's feeding the children in a nursery of runabouts with the same spoon. He also mentions the cases of two children with Vincent's angina infecting portions of their own body, and one of a recently admitted child as carrier of the organisms. In this case he ordered all house cleaning stopped except with creolin-soaked mops, after which infection ceased. Holm[27] mentions two small epidemics in the State Industrial School at Lansing, Michigan, and one in the Home for the Feeble Minded at Lapeer, Michigan, also four cases occurring the same day in one of the departments of the State Board of Health, but he does not regard any of them as evidence of contagion, not apparently following each other, but occurring in persons influenced by similar conditions. Fraley[28] reports nine cases during quarantine for diphtheria, a common drinking glass supposed to be the medium of infection. It is interesting to note here the comment of Dr. S. McCall Hamill,[28] who thinks Fraley's cases not due to direct contagion, but to lowered resistance following the use of antitoxin, Vincent's organisms already existing in the mouth and becoming virulent during lowered resistance. This is a warning note in the use of antitoxin.

Hamill, however, recognizes the contagious character of Vincent's angina, and cites the case of a physician who had a severe attack after an infected child had coughed in his face.

To prevent infection, eating and drinking utensils should be kept separate and sterilized and all mouth discharges burned. The throat, mouth, and teeth should receive special attention following an attack, to prevent infection of others and reinfection of the patient himself.

Fraley and a number of others think the disease should be made reportable.

PATHOLOGY.

Vincent[16] describes two forms of the disease. The first, diphtheroid, characterized by the pseudomembrane, he describes as follows: "The first form resembles diphtheria very much. It begins with a slight pharyngeal pain, and one finds a little whitish spot, at first scant, then thicker, which enlarges and rests upon the red and inflamed mucosa. This membrane may attain one or two centimeters in diameter. The margin is thinner. It is easily removed. It is compact. One sees that it rests upon an ulcerated and bleeding surface. It exists with dysphasia and a slight fetidness of breath. The submaxillary glands are usually swollen. A slight fever accompanies the first appearance of this form of angina. It lasts about eight or nine days. This variety is characterized by the fusiform bacillus alone, or it may be associated with streptocoque or staphylocoque, etc." Vincent says this form is very rare; that he has seen only two cases in one hundred. The ulceromembranous form he considers more common and more important. This second form is more intense than the first and more destructive of tissue. In this both the fusiform bacillus and the spirillum are present. The usual point of attack is the tonsil. As a rule it is confined to one side, but it may involve both tonsils, the uvula, soft palate, tongue, gums, mucous surfaces of the cheeks and lips, the sublingual glands, and the larynx or trachea, the last especially in children. Sutter[21] says in scarlet fever patients he has seen the lesion extend to both pillars of the fauces, the tonsil, the lateral wall of the pharynx, and extend a short distance into the nasopharynx. Place[23] reports a case in which the nose was affected with marked caries, and there was a foul odor and a sanguinary discharge. Though the disease may spread widely, extension is not common. It is more apt to be localized in a small area. Bryan[20] reports finding the organisms in a specimen from the suppurative condition around one tooth, and in another case of a man who complained of a continuous expectoration of bloody fluid, which flowed from his mouth even at night when he was asleep. This was due to the bleeding, spongy condition of the gums. Dr. Howard Childs Carpenter's[28] experience has been that the lesions usually occur along the margin of the gums, on the inside of the cheeks, and finally on the tonsils. He says that cases in which the infection is on the gums are most resistant, as the organisms find their way under the gums and between the teeth. He has found tincture of iodin applied to the margin of the gums most effective.

Wherry[29] divides the types into tonsillar and extratonsillar, each characterized by the specific organisms, but with distinct pathologic influence, the extratonsillar being much less characteristic. In this type there is a superficial ulcer, surrounded by a red, somewhat raised aureola. Unless the tonsil is involved the course of the affection is that of a simple ulcer.

Pathologists give three stages to the progress: the first, congestion; the second, formation of the membrane, from one to several days after the onset, and the third, ulceration, followed, when the prognosis is good, by repair; when it is not so good, by gangrenous processes and rapid destruction of tissue. The progress is, however, not always well defined. The extension of the ulcer is usually lateral. The pseudomembrane is commonly grayish, but it may be white or have a yellowish, greenish, or brownish tinge. Green[18] reports in advanced stages "extensive areas of necrotic bone, a black gangrene of the soft tissues, and perforations of the cheeks, lips, and hard palate." Some others report the same, but Dr. Norval H. Pierce,[54] of Chicago, does not believe that the disease causes perforations of the palate and cheek. Such cases he regards as syphilis, the smears from which may be filled with Vincent's germs. The membrane when removed leaves a surface easily bleeding and tender, the membrane again appearing in the course of a few hours.

The tonsillar form[29] is a necrotic ulceration, starting in a crypt, usually behind the anterior pillar, where the drainage is not good. The germ has lodged in a spot where the undischarged secretions form an excellent breeding place. Here infection starts, and nutrition of the surrounding tissues is interfered with. They slough off and leave a foul-smelling cavity. Drainage has been still further cut off and the ulcer is heavily charged with necrotic cell waste. The pseudomembrane then appears. Wherry[29] says that in many cases he has made an incision upon finding the affected crypt and given the patient great relief by the promotion of drainage. He reports the flow of pus small. As soon as drainage is again established the organisms lose their power and the fusiform bacilli rapidly pass away. This, he thinks, proves that the disease is as dependent upon poor drainage and poor nutrition as upon the presence of the germ itself. It also proves, according to Wherry, that the organisms are not very virulent.

The progress[20] of the ulcer may be rapid and destructive, and often is. Occasionally, however, marked slowness and little change is noted. O. N. Bryan reports a case in which the patient stated that he had not been free from sore throat for a year, at the beginning of which time he had a peritonsillar abscess.

A membranous stomatitis,[19] especially of the alveolus, accompanies the disease. In severe cases the submaxillary glands are much involved, being greatly swollen, but seldom suppurating. In mild cases they show no change. Attention is called by some observers to the cicatrization which frequently follows healing, although in many cases there remains no visible evidence of attack. Recovery is usually within a few days, but more persistent cases may last for weeks or even months. Occasionally there is recurrence after several months.

SYMPTOMATOLOGY.

The symptoms are interesting for several reasons. The clinical signs,[29] though fairly definite in some cases, are misleading in others. Some writers report an absolute absence of increased temperature, others report a rise[30] of from 100° to 108° F., though very few give a temperature above 103° F.; in many cases the constitutional disturbance is slight, in others it is marked; indicated by fever, furred tongue, loss of appetite, and great depression. The depression is common to nearly all cases.

The onset is sudden, beginning, as a rule, with pharyngitis, tonsillitis, or acute stomatitis, followed by the formation of a pseudomembrane. In the start the throat is dry, the tongue coated, the appetite poor and dysphagia is marked. Griswold[22] mentions "constipation, sometimes diarrhea, vomiting, pains in the abdomen, chills and fever." Many writers mention the last. The mucous membrane of the gums is often affected and the gums are swollen and bleeding, having much the appearance of scurvy. There is generally pain at the seat of the lesion, often pain and difficulty in mastication and swallowing, enlargement and tenderness of the submaxillary and cervical lymph nodes, salivation, gastrointestinal trouble, facial pain and swelling, sometimes extending down the neck[21] and to the chest. The symptoms[29] ordinarily are much like those of lacunar tonsillitis, but there is less temperature, greater malaise, and more localized pain. The total lack of temperature in many cases is wholly unaccounted for. In this characteristic lack of temperature Vincent's angina differs from every other tonsillar affection.

As a secondary infection the symptoms are more pronounced. E. H. Place quotes Woody, of the Philadelphia Hospital for Contagious Diseases, and Halsted[19] quotes Place, as follows:

"The disease is characterized in secondary cases by little elevation of temperature, but with rapid, feeble pulse, profound prostration, excited nervous system, irritability, wakefulness, tremor, and frequently in later stages with the Hippocratic facies and death in a brief period from toxemia or exhaustion. The odor is characteristic, with salivation and moderate cervical entumefaction, and the spongy, friable, and readily bleeding gums are almost invariably present, in some cases simulating scurvy. In severe cases necrosis is very rapid, tissues melting away, destroying large areas in an incredibly short time."

Secondary involvement is reported by Queyrat, Green, and many others.

The ulcers vary in size and depth. The edges[30] of the ulcer in the deep variety may resemble the edges of the syphilitic ulcer. It has a base resembling a worm-eaten surface and a punched-out appearance. There is usually an aureola, indicating "stasis of blood."

The membrane is soft and thin and adheres loosely for the first two days. After that the tonsil becomes inflamed and the membrane takes deeper hold, ulceration develops, and tissue destruction begins. The membrane thickens and rises above the surface, increasing still more its adherence, but remaining soft. When removed it leaves an ulcerated cavity beneath, and new membrane immediately forms. The necrotic covering[30] is not thick or fibrinous, which characteristics are of value in distinguishing the disease from diphtheria.

As stated, the breath is fetid. The characteristic odor of the disease is mentioned by all observers. The depression is very great, especially where the membrane covers a broad surface and the case is of the severer type. This characteristic is unaccounted for by all writers. It may be due to lowered tension in the nerves from some peculiar influence of the toxin upon the nervous system. There is very marked effect upon the nervous system in the later stages of the severer type. The local pain resembles the pain of quinsy, and at first sight there may be a tendency to diagnose the latter. The cervical glands are usually tender and swollen.

In an attack of ordinary duration,[29] the ulcer soon loses its necrotic appearance, and a deep hole exuding pus and cell waste remains. At this point the germ has usually disappeared, but the specific treatment should be continued.

Chills, followed by sweating and headache, with fever may continue for several days before the appearance of the exudate. In scrofulous patients swelling and tenderness of the lymph nodes may continue indefinitely, but suppuration is infrequent. Some observers report a saffron color[19] associated with severe types. According to Sutter,[16] "infection occurs only when the mucous membrane is abraded, and it often becomes engrafted upon a preceding attack of amygdalitis."

Recurrence is not uncommon. Halsted[19] says it is a marked characteristic of mild cases resembling syphilis, and that a cicatrix or scar in the soft palate or throat is no more presumptive evidence of previous syphilitic diseases than it is of previous Vincent's angina."

BACTERIOLOGY.

The fusiform bacillus is thin and rod-shaped and either bent or straight, with pointed ends and swollen center. It is from 5 to 12 microns long and often not more than a micron wide, though it may be as much as five microns wide. It is reported by Vincent and many others as nonmotile. In certain media, however, motility is very evident. The spirillum is a slender, delicate spiral, varying in length and convolutions; some report from two to twelve turns, coiled or twisted. It is of the same thickness throughout, from two to four microns, as a rule. It may be twice as long as the bacillus. It is motile[31] and retains motility for some time unless exposed to air or cold. The spirilla sometimes appear singly, sometimes in small groups, and again in considerable mass. Though closely associated with the bacilli, they have no definite arrangement. When one is seen in close contact with a bacillus, its "resemblance[31] to a bacillus with long, wavy flagellum," as White says, "is striking." The spirilla are found in great numbers on the surface of the ulcers.

The spirillum[32] of Vincent must not be confused with the spirochete dentium, which has about five shallow spirals, though some have considered them the same organism; with the treponema pallidum, which has from six to twenty-five spirals; nor with the spirocheta refringens, which has wider turns and greater size.

As Tunnicliff, Holm, and others observe, the organisms are polymorphous and present many forms not truly typical. Tunnicliff says that spores are often found during the first days of growth, and filaments of various lengths may appear in from twenty-four to forty-eight hours of incubation or later.

Nearly all observers report the two organisms together, but Burlig[33] describes a case of Vincent's angina without spirochetes, and a few others have reported them absent. These cases were probably of the diphtheroid type, which Vincent describes as being characterized only by the bacillus. The spirilla are always present in the deeper form of Vincent's angina. White[31] says in mild cases other organisms, such as the streptococcus, pneumococcus, and bacillus coli communis, may appear, but that in the deeper forms only the bacilli and spirilla occur. The spirillum is never found alone.

It is not yet certain whether the disease is due to the fusiform bacilli alone, or whether the spirilla have any part in the infection. Some authorities hold that the spirilla lessen tissue resistance and thereby assist the bacilli in their work of infection. Escherich considers the spirilla mere spongers without etiologic influence. Most observers regard the organisms as separate, and some[34] have found each as a saprophyte in the human mouth, the bacillus in the tonsillar crypts and the spirillum around the gums and carious teeth.

Many recognize the organisms as distinct and acting in symbiosis, but Tunnicliff[35] and many others consider the spirillum the adult form of the bacillus. Vincent vigorously opposes this theory and is supported by a number of other observers. Rhea, of Montreal, says some of his mixed cultures were kept more than a month without producing spirochetes. A statement by Tunnicliff[36] is worthy of notice here. She says: "Whether the spirilla formed from the fusiform bacillus [in cultures] are the same as those found in the lesions themselves cannot be decided, on account of the inability to reproduce the lesions in animals." This writer and others have been practically unsuccessful in animal experiments, although such efforts as lowering resistance by injections of bichlorid of mercury, lactic acid, etc., have been employed in the hope of rendering infection easier. Wright and Mackie regard the organisms as but a stage in the life of the trypanosome. Strasser[37] calls attention to the opinion held by Wright, that the fusiform bacillus is not a bacillus, but of protozoic origin, his conclusion being based upon its "length, vacuolation, staining properties, and undulatory movements," and to the somewhat inverse opinion of Mackie, that "under certain cultural conditions the trypanosome loses many of its features and becomes similar to Vincent's organisms."

White and Blackwood[38] quote Hermann, as follows: "Hermann,[39] in summing up the literature on noma, endeavors to simplify the different findings by advancing the theory that the spirillum of Vincent is simply a stage of development of the bacillus fusiformis, and that this latter organism and the streptothrix of Perthes are identical with the spirillum sputigenum and the spirochete dentium which Miller found in mouths as saprophytes. Hermann further states that he considers the spirochete dentium as only a stage of development of the spirillum sputigenum, thus claiming (as previously held by Krahm) that noma is probably caused by the saprophyte spirillum sputigenum, assuming under favorable conditions a parasitic role. He would call this organism the spirochete of necrosis. He still further states that he considers the bacillus necrosis of lower animals to be closely related to this spirochete necrosis."

White and Blackwood[38] found a case of noma in a Rhesus Macaque monkey, and upon examination found the pathogenic organisms in the mouths of normal monkeys.

There are numerous ways of demonstrating the fusiform bacillus and the spirillum of Vincent. Carbol-fuchsin and anilin gentian violet are commonly used, and the organisms stain deeply and well with both. With Gram's method the spirilla decolorize and the bacilli decolorize irregularly, and most of them lose the stain. White reports simple basic stains as coloring well. With most stains the reaction for both organisms is about the same. The bacilli do not stain evenly, but appear in stripes, with deeper stain near the ends. The spirilla are more difficult to stain, and appear with less distinctness, but with complete regularity. Holm and others report success with Unna's polychrome methylene blue, and some have used Bismarck brown successfully. There are others, however, who find with Unna's alkalin blue, Loeffler's methylene blue, Bismarck brown, etc., only faintly stained areas of the bacilli, such areas not being definitely outlined and not resembling spores. Staining for spores and flagella, it may be stated, is not successful, which does not support the theory of protozoic origin. E. Baron, however, reports observation of flagellæ. Giemsa's stain and India ink are satisfactory.

Shea[32] gives the following method of demonstrating with the India ink process of Hech and Wilenko: "The superficial necrotic area is removed gently, and a small drop of underlying fluid placed on a slide cleansed by means of soap and hot water and wiped off with alcohol. To this add a small drop of India ink (Genther's or Higgins'), and mix thoroughly by means of the platinum loop. With a strip of cigarette paper one-half inch wide smear this over the slide. It dries rapidly. Then place cedar oil directly upon the smear and examine the specimen with the one-half inch oil immersion lens and the one-inch eyepiece. The organisms will appear, together with blood cells, as clear, unstained bodies upon a dark gray background."

The bacilli are usually quite evenly distributed throughout the smear, and are often seen in pairs or end to end, sometimes in tetrads. They present among regular forms many degenerates. The bacilli appear in stains earlier than the spirilla, sustaining Tunnicliff's theory that the fusiform bacillus passes through a stage or stages of growth and then becomes the spirillum. This theory seems to be supported also by the fact that the bacilli decrease as the spirilla increase. In earlier processes of the disease they are more abundant than the spirilla, but in later processes the latter are much more abundant.

Cultures are very hard to make. Both the fusiform bacillus and the spirillum are anaerobic. The spirilla appear even in anaerobic conditions only after a long period, the bacilli possibly having to pass through two or three generations. Earlier observers were unable to make cultures at all, because it was not known that anaerobic conditions were necessary and because sufficient time was not given the growth. Nicolot and Marotte succeeded in cultures of fluid media or the water of condensation of solid media, but their cultures were not pure. Silverschmidt uses a one per cent acetic acid bouillon. Cultures on Loeffler's blood serum have been measurably successful. The organisms[23] require such media as blood serum or ascites fluid. Dr. Lawrence Rhea,[23] of the pathologic laboratory, Montreal General Hospital, as quoted by Place, says: "The organisms are anaerobic and grow best upon fresh blood serum, best that of the rabbit, added to one-third or one-half sugar bouillon." Rosenow and Tunnicliff[40] state that the fusiform bacillus grows anaerobically on human, sheep's, or goat's blood agar, and that the last is the best medium, growth occurring after forty-eight hours at 37° C. Tunnicliff[36] grew both organisms anaerobically on slants of blood agar by Wright's pyrogallic acid method "by saturating the cotton stopper with a strong solution of pyrogallic acid in a five per cent solution of sodium hydroxid, and closing the tube with a tightly fitting cork and sealing it with paraffin." Her organisms in Vincent's angina were isolated on slants of ascites agar (1:3), those in gingivitis and noma on blood agar. She states that the material was placed on a series of slants, and that as a rule in the second tube the bacilli appeared at the end of three or four days, the temperature being 37° C. After that time spirilla gradually became visible, increasing in numbers and finally constituting the majority of the organisms. Tunnicliff[36] found the spirilla most often in a medium of 5 cc. of agar together with twelve drops of equal parts of sheep's or goat's blood and a two per cent solution of sodium citrate in a normal solution of salt. She adds that as the organisms die out rapidly, it is necessary to transplant a large number to get a successful culture. Rhea[23] reports that he has never been able to find the spirochetes living eight or ten hours after the culture was made. He has been able to isolate the organisms in pure culture, growing them for a short time on anaerobic plates. White[31] obtained results from a one per cent and a .5 per cent acetic acid bouillon and in Dunham's solution, but failed of results from solid media tried at the same time. He reports the bacilli as nonmotile in broth or peptone cultures, and the spirilla as showing slow, progressive movements in hanging drop up to twenty-four hour old cultures. Tunnicliff reports that the organisms show no progressive but considerable vibratory movement, and that the spirilla retain their spiral form. Some observers find both organisms motile in hanging drop.

It is interesting to note that noma,[41] gangrenous stomatitis, and hospital gangrene are as difficult to study by cultures as Vincent's angina.

The great importance of demonstrating the organisms is, of course, to render diagnosis correct and differentiate the disease from diphtheria and other affections which it resembles. The earlier observers had greater difficulty than is now experienced, because the smears were subjected to a diphtheria test, which is negative as far as Vincent's angina is concerned. Often the case was pronounced diphtheria and antitoxin resorted to, when, in reality, the disease was Vincent's angina. Oftener still, the clinical diagnosis was diphtheria without bacteriologic examination. Holm[27] gives an illuminating report, referred to by several later writers, from an examination of two hundred and sixty-five cases. Of these two hundred and sixty-five the clinical diagnosis was diphtheria in ninety-nine. The laboratory report from these ninety-nine cases showed diphtheria in sixty-four. In seventy-three cases showing Vincent's organisms, diphtheria was diagnosed clinically in twenty-eight. Examination of the twenty-eight showed bacillus diphtheriæ present in one, absent in twenty-seven, demonstrating an error of 96.4 per cent in the clinical diagnosis of diphtheria for Vincent's angina.

Of the seventy-three cases, thirty-three were males and forty females; the lowest age was two years, the greatest fifty-five, average eighteen; in all but four cases a membrane was described, involving one tonsil in thirty-one, both tonsils in thirty-eight, extending to adjacent structure in fifteen; in forty-one cases the color of the membrane was grayish, in nine yellow, in eight white, in two grayish yellow, in one grayish green, in two creamy; the highest temperature was 103 3/5° F., the lowest 98½° F., average 100½° F.; the clinical diagnosis was diphtheria, as has been said, in twenty-eight cases, scarlet fever in one, Vincent's angina in five, tonsillitis in seventeen, questionable in twenty. Of the entire seventy-three cases, which may all have been Vincent's angina, only five had been so diagnosed clinically. Again, Holm says that in the two hundred and sixty-five cases diphtheria was diagnosed clinically in ninety-nine, while the laboratory report showed the diphtheria germ present in but sixty-four. The clinical error in diagnosis here, then, is 35.3. He refers to the laboratory of the Massachusetts State Board of Health as demonstrating clinical error of 38.4 per cent in 4,113 cases. This means that more than 1,500 of the 4,113 cases were wrongly diagnosed outside of the laboratory. Holm refers also to error in clinical diagnosis of 29 per cent, or 8,700 cases in 30,000 cases of supposed diphtheria mentioned by Dr. G. S. Graham-Smith. Epler[27] says that about one-third of the cases of virulent diphtheria present a simple angina clinically, the Klebs-Loeffler bacillus being found deep in the lacunar plugs.

Dopter,[42] in a clear, practical exposition of the bacteriologic analysis of the anginas, with excellent plates of d'angine diphtérique, d'angine streptocoques, d'angine de Vincent, d'angine à meningocoques, d'angine à pneumocoques, and d'angine polymicrobienne, says direct examination is indicated in cases in which the pathogenic germ is not cultivable, and that this is the case with Vincent's angina, though we know, as has been stated, that it is possible to cultivate Vincent's germs under certain anaerobic conditions with a long time given to incubation. He adds that one smear of the putrilaginous substance with the symbiosis of fusospirillaire renders the diagnosis self-imposed.

This writer says that were it not for the fact that Vincent's organisms do not take Gram's method, they might voluntarily be taken for the Klebs-Loeffler bacilli.

Burlig[33] holds that cultures should be used as a control upon direct smears, that a smear will sometimes show only cocci, and therefore diphtheria be ruled out, when cultures upon Loeffler serum would show the presence of the diphtheria bacilli; and, on the other hand, that there are other smears giving evidence of organisms which so closely resemble the diphtheria bacillus that diphtheria would be diagnosed, but cultures would show the absence of the characteristic germ. Cultures may, as Burlig suggests, be a safeguard upon smears, but it is the smear first and last that must be depended upon, and no diagnosis of Vincent's angina can be considered correct without it.

Burrage[43] calls attention to a case in which the smears showed Vincent's organisms, together with some staphylococci, and a culture in blood serum showed at the end of twelve hours "many colonies of staphylococcus albus and some of pneumococcus, but none of diphtheria or of the organisms found in the smear." This, we may conclude, was because the media was not that in which Vincent's organisms can be grown—and, I may add, the spirilla will not grow in any culture in twelve hours. In such a case it would be an egregious error to rule out the smear and render diagnosis from the culture alone.

DIAGNOSIS.

As a pseudomembrane in the throat[19] may be caused by the diphtheria bacillus, the streptococcus, the staphylococcus, the pneumococcus, micrococcus catarrhalis, bacillus coli, the fusiform bacillus and spirillum, and two or more are present in nearly every infection, the diagnosis in such cases is necessarily complicated. Vincent's angina may be confused with an ulceration of the gums, a mucous patch, lacunar tonsillitis, syhilis, diphtheria, carcinoma, and other similar affections, and it may be associated with other organisms in lesions which it does not produce.

The etiologic influence of Vincent's organisms is not always clear when they are found in association with other organisms. The rule is that the organism found in preponderating numbers must be held responsible for causation; still caution must be employed, as the organism present in smaller numbers is sometimes proven to be the true causative factor. The mere question of numbers[27] is determined largely by the character of the media, which develops more of the organisms to which it is best adapted. In the presence of Vincent's organisms and the diphtheria bacilli, the former may be the pathogenic germs. Holm remarks that Vincent's angina or other membranous affections may occur in diphtheria bacilli carriers, and he cites three cases of Vincent's angina following diphtheria, in one instance at the end of four months, with the diphtheria bacillus still present. Arnold[11] reports a case of septic scarlatina with ulceration of the fauces in which the fusiform bacilli and the spirilla of Vincent were greatly in excess of other organisms, but the regular course of septic scarlatina continued and Vincent's organisms disappeared after two days. He mentions two other cases of scarlatina in which the fusiform bacilli and the spirilla appeared without symptoms in the convalescent stage. He found them also in excessive numbers in follicular tonsillitis. Unlike most observers, Place[23] has seldom seen Vincent's organisms after diphtheria, scarlet fever, etc.

Every care should be used, especially in the diphtheritic type, to exclude diphtheria. It should be remembered that the ulcer is deep and long and does not appear to be spreading from the edges, as in diphtheria, and that the character of the membrane is different—in diphtheria, thick and tough: in Vincent's angina, light and friable. These signs and the smear should render the diagnosis accurate. Membranous croup and laryngitis must be considered in the differential diagnosis. According to Halsted,[19] many of the fatalities supposed to be the result of membranous croup or pseudodiphtheritic laryngitis in children, when no Klebs-Loeffler bacilli were found, were caused by Vincent's angina attacking the larynx. In the ulceromembranous form the diagnosis may be difficult in the start, but as the symptoms become more accentuated it is easier. Wherry[29] says that in the second stage, when the ulcer has broken down, there is no danger of confounding the disease with anything but lues; and when the sudden attack and decided toxic influences are considered, even that is precluded. Vincent[16] grants that the disease is easily confused with syphilis, and states that secondary and tertiary syphilis may be secondarily infected by the fusiform bacilli and the spirilla. He says these organisms have a peculiar affinity for syphilitic ulcers on the pharynx. He acknowledges the difficulty of diagnosis in such a case, but says that the treatment will soon determine which disease is being dealt with in the attack. Salamon reports two cases of Vincent's angina in conjunction with syphilis, the latter appearing after the exudate of the angina had disappeared. Vincent's angina may also become engrafted upon a stomatitis due to mercury.

Place[23] offers the following valuable suggestions for differential diagnosis: That Vincent's angina differs from diphtheria in being always an ulceromembranous process, which diphtheria primarily is not; that it differs from primary syphilis in not being marked by infiltration or any pronounced adenopathy or other signs, and in ready response to local treatment; that it differs from mucous patches in more decided ulceration and distribution, the absence of other signs, evidence in the smear, and absence of Wassermann's reaction; and that the smear, the culture, the progress, the history will all differentiate it from other ulcerations of the mouth.

Arnold[11] does not regard the organisms of Vincent as necessarily pathogenic, because of the fact that they are found in association with other organisms capable of producing the lesion, in cases of diverse clinical appearances, and in cases known to be very difficult to diagnose. It is unfortunate that inoculation has not proven successful. Nicolet and Marotte had slight results experimenting with a dog, but no inoculation has been followed by satisfactory results. In view, however, of the fact that a great majority of the lesions in which Vincent's organisms are found cannot be shown to be caused by any other factor; that they are the controlling organism in noma, which is an exaggerated Vincent's angina; that they are found in animals with noma; and for other excellent reasons, it appears safe to regard these organisms as genuine and positive causative agents.

One difficulty in diagnosis is the frequent absence of some of the symptoms. Another[41] is variation in symptoms. To sum up, however, the smear, the history of the case, and the treatment will give a diagnosis that in nearly every case may be depended upon.

COMPLICATIONS.

With a true case of Vincent's angina the erythema of scarlatina may appear, pseudorheumatism be troublesome, and albuminuria, myocarditis, and endocarditis be associated. Some[20] name herpes, conjunctivitis, urethritis, pleurisy, pneumonia, and noma, and Vincent says that hospital gangrene and gangrene of the lungs may accompany the disease. Young children are more subject to the gangrenous processes, which nearly always terminate fatally. Epler[27] names as possible complications "necrosis of the maxilla; destruction of tonsils and adjoining parts, as the uvula; necrosis of the pharynx; nephritis; peripheral neuritis of the lower extremities; swollen joints and axillary nodes; albuminuria; endocarditis; mastoiditis; brain abscess; and peribuccal abscess." A. Baron, of Dresden, found out of one hundred and twenty-three cases of Vincent's angina sixty-seven with ulcerostomatitis and eighty-five with catarrh. Chambers and Willson[30] report ulcerative stomatitis as an associated condition in some cases, and state that the ulcerative gingivitis is variable in degree, now and then causing ulceration of the gum edges, similar in appearance to pyorrhea alveolaris, and add that some regard the fusiform bacillus as causing pyorrhea alveolaris. According to Halsted,[19] Vincent's organisms are, at times, the cause of laryngitis, bronchitis, bronchopneumonia, pneumonia, hospital gangrene, abscess of the lungs and spleen, and phagedenic ulcers of the penis and genitalia. Rosenow and Tunnicliff[40] report what they suppose to be the first recorded case of a fatal general infection due to the fusiform bacillus alone. The patient had appendicitis, following which pyemia, producing multiple abscesses in numerous parts of the body, the result being fatal. Bruce[44] reports three deaths, two due to suppurative bronchopneumonia after the larynx was involved, and one to toxic absorption from the lesion. Gilberti[19] reports a case of ulceromembranous stomatitis and angina followed by osteomyelitis of the lower jaw, causing death. Mayer describes a case of pernicious anemia with an infection of Vincent's angina, resulting in death, and Halsted[19] reports a similar case. White[31] mentions one case with appendicitis, and a few cases are mentioned in connection with typhoid fever, but it is not demonstrated that Vincent's organisms in these last named cases were responsible for more than their own characteristic lesions. The prognosis of the diseases they accompanied was, however, affected by them. An exceedingly interesting report is that of Green,[18] in which he says that "cancrum oris is a neglected or aggravated Vincent's angina." This theory has been partially demonstrated by others. Some[45] have stated that stomatitis gangrenosa, Vincent's angina, and noma may be different stages of the same disease, but Green seems to leave no doubt that noma, at least, is an advanced stage of Vincent's angina. He reports seven cases in nine months that advanced to the stage of noma because the initial lesion was not observed. Four of these recovered. Green thinks that if Vincent's angina is taken in time noma may always be avoided. Corbus and Harris[46] describe a case of gangrenous balanitis, and state that they regard this form of balanitis as closely allied in bacteriology to noma, Vincent's angina, and mercurial stomatitis, and suggest that the cause of infection is probably the same in all. It is interesting to notice under this head the studies of Chamberlain[26] in the Philippines, which relate to the finding of the fusiform bacilli and the spirilla of Vincent in ulcers of the skin and in pulmonary diseases. He calls attention to the fact that Vincent believed ulcus tropicum due to his organisms, and that Vincent's observations have been confirmed by Smith and Peil in Sierra Leone, Patten in Aden, and others.

Royer[47] thinks a broad clinical term should be found to include all lesion caused by the fusiform bacillus and the spirilla, whether on skin surface or mucous membrane, and whether they are membranous, ulcerous, or gangrenous in character, but says that for the present we must be satisfied with the term Vincent's angina for the mucous membrane lesions, and noma for the gangrenous skin lesions. Be the term what it may, the fact remains that these organisms have a wide range of influence, and this renders them a very important study.

TREATMENT.

If the form is tonsillar, treatment should be applied at once to the affected crypt, promoting drainage, keeping the ulcer clean and applying a twelve per cent strength of silver nitrate, which is used by nearly all who have to deal with Vincent's angina. Trichloracetic acid, administered in full strength, has been employed by a good many with great success.

Green[18] describes the application as follows: "I apply it to a freshly cleansed, dry surface to prevent its floating about in the saliva; to avoid extensive cauterization the tissues are painted with melted petroleum or other grease, leaving only the infected area exposed. To lessen the pain of cauterization I drop a few acid crystals into six or eight drops of a four per cent solution of novocain."

He repeats cauterization every two or three days, if needed, and irrigates the mouth with a 0.5 per cent solution of formaldehyd. In case the characteristic odor of the disease is bad, he alternates with irrigations of permanganate. For experiment Green omitted all irrigations in several cases to test the value of the acid, and found that the acid alone effects a cure. Halsted[19] regards trichloracetic acid as best in mild cases simulating syphilis. He uses a ten per cent solution of cocain to anesthetize the ulcer before applying the acid. Iodin, he says, is preferable only in cases in which the ulceration involves a large surface. Shea[32] describes a case in which he gave two grains of sodium cacodyiate by mouth, then, after removing the membrane, applied tincture of iodin, full strength, during the first two days, a twenty-five per cent solution of silver nitrate on the following two days, and afterward a ten per cent solution daily until the patient was discharged. This case was somewhat aggravated and lasted a month.

When iodin is used the specimen for the smear should be taken from the bottom of the ulcer before the application is made, because the organisms disappear from the surface after iodin is applied, even when they were abundant before the application. Some use chromic acid on the ulcer and peroxid of hydrogen for removing the necrotic material. Place[23] reports that swabbing with hydrogen peroxid, full strength or diluted one-half, until the ulcer is clear and then painting with a two per cent solution of chromic acid once daily, will effect a cure in from two to six days in almost every case. Even when the patient recovers, however, there are discouraging exceptions to ready success in treatment. Bayer[48] describes a tenacious case beginning in early winter and continuing until May, in spite of the most vigorous and varied treatment, both external and internal. The local treatment included chromic and trichloracetic acid, recommended as being certain and quick. The patient finally entirely recovered, with no marks of the disease remaining.

Some employ the cautery or excision when necrosis appears. Both are condemned, however, by most writers. After cleansing the ulcer some[21] use a ten per cent solution of copper sulphate, followed by potassium chlorate or tincture of iodin applied to the ulcer. Potassium chlorate, either locally or internally, is effective, and othoform in powder or in tablet may be used to give relief from pain. Griswold[22] has used subacetate of copper successfully, checking its action by peroxid of hydrogen and giving tonic treatment. Peroxid of hydrogen applied to the lesion he considers most effective because of the anaerobic character of the organisms. Drugs not already named with which writers report success are: Carbolic acid, argyrol, ormorol, zinc sulphocarbolate, potassium iodid, iron and glycerin, lithium salicylate, methylene blue, and salvarsan. Some French writers[49 50 51] report marvelous cures with salvarsan. One case of a very serious aspect was cured in three days by five applications of salvarsan. Another case which had lasted two months was cured in three days. Other extraordinary cures are reported, some by local use, some by extravenous or extramuscular, but the local use is recommended as best adapted to the general practice. Anglada and Reveilhe[49] regard salvarsan as indicated in Vincent's angina more clearly than in almost any other disease.

When associated with diphtheria, diphtheria treatment must, of course, be employed. Holm[27] says antitoxin should be used except where the patient is a diphtheria carrier. He mentions two cases in which the fusiform bacillus and the spirilla were associated with Klebs-Loeffler organism. Antitoxin was employed and the membrane promptly disappeared. In another case, however, 5,000 units had no effect. In still another, because of its resemblance to diphtheria, 6,000 were employed, but without effect. As before intimated, care should be employed to avoid ill effects upon Vincent's angina in lowering resistance by the use of antitoxin. Weil[34] also sounds a warning note touching the use of mercury where the case resembles syphilis. When syphilis is associated with Vincent's angina, he recommends the curing of the angina before using mercury, as mercury has the effect of increasing and prolonging the angina.

The treatment should, of course, include prophylaxis and attention to the hygiene of the mouth. Halsted[19] says that no progress need be expected until carious teeth and ulcerations around them are attended to. He recommends constitutional treatment, as do a few others.

PROGNOSIS.

As a rule the prognosis is good. The disease is likely to run its course in a few days, but the more obstinate cases may last two or three weeks or longer, and the very serious may run into months. If the case is not seen until an advanced stage, the prognosis is naturally not so good, and when the disease attacks the larynx or trachea, especially in children, the case may be fatal. The mortality of Vincent's angina, on the whole, is not large, but with complications the tendency is to a fatal result, and in this statement are included the severer cases of mixed infection. McKinney[52] says that in his experience in a virulent type of mixed throat infection a fatal termination is to be expected, and that antitoxin given even in the early stages is not as effective as when employed in pure diphtheria. He quotes Kyle as saying: "The presence of streptococci, in addition to the bacillus diphtheriæ, augurs ill for the patient, because to their effects are due the complications of the more malignant character." Fraley[28] and others consider the prognosis most unfavorable when Vincent's angina occurs as secondary to some other infection. Practically all observers regard primary Vincent's angina as having a good prognosis.

CASES.

Rogers, of Philadelphia, reports a fatal case during pregnancy, beginning with severe tonsillitis. Vincent's organisms were abundant. No diphtheria bacilli appeared, but the patient was removed to the diphtheria ward before the laboratory report was received, and there contracted diphtheria. Septic pneumonia developed on the eleventh day. The autopsy showed tonsils, uvula, under surface of the tongue and the lungs affected with gangrene. Klebs-Loeffler bacilli appeared in both lungs. The left lung showed tubercle bacilli. Beginning with virulent Vincent's angina, the case under autopsy showed nephritis, endocarditis, diphtheria, pulmonary tuberculosis, lung gangrene, and swelling of the spleen and liver.

A. Baron, of Dresden, reports a case of Vincent's angina which without the aid of the laboratory would have been diagnosed diphtheria. A girl of fourteen years contracted lacunar tonsillitis, with pain in throat, chills and formation of membrane on right tonsil, but not spreading. No Klebs-Loeffler bacilli, but Vincent's organisms were abundant in pure culture. There was disturbed circulation, irregular heart action, gallop rhythm and dilatation, symptoms of myocarditis, dizziness, and swollen liver. The membrane lasted three weeks. The patient was confined to her bed three months, with pulse one hundred and sixty upon any exertion. Her general health improved, but faucial paralysis developed with inability to swallow or to speak with distinctness. There was difficulty also in moving the arms and limbs. After electrical treatment and baths the patient recovered, with no trace of former complications.

Anglada's[49] case, cured in three days by the use of salvarsan, was a case of great involvement. The membrane spread widely, almost the entire throat was involved, the submaxillary glands were affected, breathing was difficult, expectoration continuous, and there was fever, rapid pulse, intense functional troubles and bad eruption, with suppuration upon pressure.

Yates[53] describes a case of mastoiditis due to Vincent's angina. A girl of twelve years, with a neglected running ear of several months' standing, with swelling over the mastoid region and signs of subperiosteal abscess, was operated upon. A dram and a half of foul-smelling pus was removed. A large part of the cortex was gone, and a dark red, spongy mass filled the space that should have been filled by the cellular bone structure. The dura of the middle fossa was extensively exposed, the lateral sinus uncovered, and part of the posterior bony canal wall was destroyed. The patient later had measles, and the ear trouble increased. A discharging sinus appeared behind the ear and refused to close. North's lactic acid serum was used, however, and after ten days the sinus closed.

Yates considers Vincent's angina as one of the most troublesome and tenacious of diseases. He does not believe it can enter the tympanum, however, except through a preceding affection.

White[31] records a case of typical aggravated Vincent's angina with psoriasis, involving extensor surface of knees and elbows, with slight chest lesions.

Arrowsmith[54] reports a remarkable case involving the larynx alone. The patient, a man of twenty-six years, appeared for treatment after having suffered with discomfort in the throat with increasing hoarseness and dyspnea for about a week. No trouble was manifest in the thorax, but respiration was difficult. There was no increase of pulse or temperature. The urine bore slight traces of albumin and sugar and a small number of granular and hyalin casts. Owing to pronounced dyspnea, tracheotomy was hurriedly performed. This relieved the trouble so that the patient was discharged in three weeks, but he returned in about two weesk with decided recurrence. Pus had collected in the peritracheal parts, and this foul-smelling matter was discharging from the incision, which had reopened. Small abscesses had formed, and the suppuration was teeming with Vincent's organisms. The sputum was not immediately examined, and it cannot be stated whether the organisms were then attacking the interior of the trachea or larynx. Dyspnea again necessitated tracheotomy, and both smears from the interior tracheal matter and the sputum from coughing contained numbers of the fusiform bacilli and the spirilla. Blood analysis showed slight anemia, and the urine was not altogether normal. The odor of the tracheal secretion was very offensive and very persistent. For six weeks almost pure cultures of Vincent's organisms were shown from the tracheal secretions, the sputum, and the wound, sometimes with pneumococci, staphylococci, and streptococci. The condition continued unchanged and a thyrotomy was performed. A mass of cheesy exudate filled with bacteria was removed. Beneath this the mucous membrane bled easily and showed erosion to the bare cartilage in places. Both a Wassermann test and syphilitic treatment indicated the absence of syphilis. About a month later the urine was almost entirely suppressed and analysis showed 30 per cent of albumin by bulk, all manner of casts, free blood, and epithelium, renal and vesical. Symptoms of uremic poisoning continued for several days, and the kidney symptoms returned several times later on. About four months after the beginning of the first attack, Vincent's organisms had very nearly disappeared from the tracheal secretions and the sputum. Stenosis of the larynx was produced by cicatricial contraction, and at the time of the report, eight months after the first attack, the patient could breathe comfortably through the larynx only with the tracheal tube open. He could speak, but his tones were not harmonious. Repeated attempts to dilate the larynx with Schroetter's tubes were unsuccessful. Owing to the condition of the kidneys, it was not deemed wise to operate again. No evidence of any lesion due to the specific organisms appeared in the mouth or throat, nor were the adjacent lymphatic glands involved.

Arrowsmith regrets that it is not known whether the infection started in the larynx or trachea or in the peritracheal areolar tissue. He says he has not been able to find in the literature on Vincent's angina that the fusiform bacillus and the spirillum have been found in the discharge from sinuses or abscess cavities.

Rothwell[55] reports two cases of his own and one of Dr. Frank J. Hall, a pathologist of Kansas City, Missouri, in which Vincent's angina attacked the bronchial mucous membrane. One of his cases is the following: A lady, while shopping, was taken with a chill. The case was pronounced severe pneumonia. The temperature was 104° F. There was intense pain in the left side, constant coughing, profuse bloody sputum, a sensation of oppression over the upper portion of the chest and of smothering. The breathing and coughing resembled asthma and croup. There was no throat affection and no consolidation of the lung. The tongue was clean. The case was bronchial Vincent's angina, as shown by the smear, teeming with the specific organisms. The character of the trouble remained the same, but gradually grew less severe. For two weeks the temperature varied from normal to 102° F. The patient was up in three weeks, but for two or three months the fluid bloody sputum heavily charged with spirilla was expectorated when she exerted herself in any way.

Royer[47] reports a case beginning with a pseudomembranous tonsillitis which remained localized for six days preceding labor, when it began to spread rapidly, becoming at the same time gangrenous and very destructive. The pseudomembrane extended within the cheeks "along the buccal mucous membrane from a point opposite the first molar tooth to the angle of the jaw and across the mucous membrane in front of the articulation of the anterior pillar, becoming continuous with the membranous-like material on the tonsil and uvula." There was a strip of the membrane under the tongue on each side, the tonsils were well covered and both sides of the uvula involved. The latter lesions looked like diphtheria, and the patient was given a total of 50,000 units of antitoxin. The other lesions bore no resemblance to diphtheria, and removal of the pseudomembrane revealed a gangrenous process beginning. The patient had been taken to the diphtheria ward, and on the thirteenth day Klebs-Loeffler bacilli appeared, the infection probably having come from the ward. Innumerable fusiform bacilli and spirilla had appeared from the first. The gangrenous processes extended, and all teeth becoming loose, the patient was given chloroform, the curette was used to remove all necrotic surfaces, all teeth were extracted, and the thermocautery was applied to the gangrene on the tongue, cheek, alveoli, tonsil, and uvula. The pseudomembrane reappeared over the cauterized areas and glossitis was evident.

Pulmonary impairment began on the eleventh day, and on the thirteenth day septic pneumonia set in, the patient dying on the seventeenth day. The pathologic diagnosis on autopsy was: Gangrenous stomatitis, gingivitis, uvulitis, and tonsillitis; edema of the lungs, hypostatic congestion, pulmonary tuberculosis with gangrenous area of left lung; lobular pneumonia; dilatation of the right heart; cloudy swelling of the liver and spleen; chronic diffused nephritis, and endometritis."

Bruce,[44] of London, presents a case of Vincent's angina in the larynx and trachea which is especially interesting in connection with Arrowsmith's case. The patient died in eleven days. The neck was badly involved, the skin and subcutaneous tissues becoming gangrenous and the process spreading rapidly. Bruce regards this as secondary involvement to that in the respiratory tract, and resulting from infection of the laryngotomy wound by discharges from the larynx and trachea.

Murray[56] describes a chronic case, beginning four months before he was consulted, with membranous patches on the tonsil, and continuing as an irritation. The case began when the patient was nursing typhoid fever.

SUMMARY.

Summing the matter up, Vincent's angina is the local manifestation in the throat and mouth of a disease caused by the fusiform bacillus and the spirillum bearing Vincent's name—probably the same organism in different stages of existence—which may occur in almost any other part of the body and may be membranous, ulcerous, or gangrenous. It frequently occurs after measles, scarlet fever, diphtheria, whooping cough, and numerous other diseases, and as a secondary infection it is serious. As a primary infection it is not usually serious. It is more common in malnutrates and in children and adult males. As a primary infection, at least, it is probably preventable by proper care of the mouth, teeth, and general health. It is much more common than is generally supposed, and is frequently responsible for throat and oral infections diagnosed as something else. It is contagious, but transmission depends upon close contact. It is usually acute, but it may be chronic. Recurrence is not uncommon. The point of attack, as a rule, is the tonsil, and it commonly remains localized there, but the infection may spread to cover extensive areas. The progress consists of congestion, formation of the membrane, and ulceration. The ulcer extends laterally. The progress in the severer type may be very rapid and tissue destruction very extensive. The disease commonly lasts but a few days. Occasionally, however, it runs into weeks and months. The symptoms are chiefly local, but may also be constitutional. The absence of fever in many cases, and the marked malaise are unaccounted for. The organisms are anaerobic and can only be cultivated anaerobically. Proper diagnosis is dependent upon a smear. Differential diagnosis must exclude diphtheria, syphilis, mucous patches, lacunar tonsillitis, carcinoma, membranous croup, etc. Vincent's angina may be complicated with a number of other affections. The treatment is principally local. Trichloracetic acid, chromic acid and salvarsan seem to have the quickest and best results, but many other medications are effective.

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XXVIII.

A CASE OF CAVERNOUS SINUS THROMBOSIS COMPLICATING SUPPURATIVE LABYRINTHITIS.*

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New York.

E. C., male, seven years of age, was admitted to Dr. Berens' service, at the Manhattan Eye, Ear and Throat Hospital, on April 17, 1913, with a history of discharge from the right ear for the past five years. Three weeks before, the mother noticed that the child could not close his right eye, and that his mouth was crooked. The day before admission the right eye was closed from swelling of the lids.

On admission the child looked very sick. He was apathetic. His lips and teeth were covered with sordes. His temperature was 100° F., and his pulse 100. In the afternoon the temperature rose to 103° F., pulse 134, respiration 20.

The blood count showed a leucocytosis of 36,400; large mononuclears, 7 per cent; small mononuclears, 4 per cent; polynuclear neutrophiles, 87 per cent; transitional forms, 2 per cent. Blood cluture was negative.

The right external auditory canal was filled by an aural polyp. There was a profuse, foul-smelling discharge. There was complete deafness in the right ear, and a negative caloric reaction. The left ear was normal. There was no spontaneous nystagmus.

The right side of the face was paretic, and there was paresis of the right third nerve, resulting in ptosis and divergent strabismus. The eye could move in no direction except outwards. There was slight dilatation of the pupil and some edema of the eyelids.

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*Presented before the Section on Otology of the New York Academy of Medicine, December 12, 1913.

A diagnosis of chronic diffuse suppurative labyrinthitis with thrombosis of the cavernous sinus was made.

A radical mastoid operation was done. Cholesteatoma and granulations were found in the antrum and middle ear. The facial nerve was found exposed and imbedded in granulations, for a distance of three-eighths of an inch, between the external semicircular canal and the oval window. There was a necrotic area over the external semicircular canal. All three semicircular canals were found full of granulations. They were removed and the vestibule opened. This was also found to be full of granulations. The stapes was removed. It came out very easily. The promontory was removed, and the first and second turns of the cochlea were found full of granulations. The lateral sinus and the dura of the middle fossa were exposed and found normal. The patient was put back to bed.

On the next day, April 18th, the temperature rose to 105.4° F., at which point it remained until death. The pulse ranged between 100 and 160, and the respiration between 20 and 40.

The edema of the lids increased, exophthalmos appeared, and the conjunctiva become chemotic. The dilatation of the pupil increased.

On April 19th there appeared slight edema of the lids of the left eye. The eye grounds were normal.

On April 20th exitus, at two o'clock in the afternoon.

Postmortem.—Pus and granulations were found in the right internal auditory meatus. From this point a necrotic tract could be seen leading to the inferior petrosal sinus. This sinus contained a broken-down thrombus, which continued forward into the right cavernous sinus. The clot extended across from the cavernous sinus through the circular sinus to the left cavernous sinus. In the upper wall of the left cavernous sinus there was a small perforation, about one-eighth of an inch in diameter. The pia over the tip of the left temporosphenoidal lobe, which was in contact with this perforation, was covered with exudate. This patch of exudate was sharply circumscribed in outline. It was one and one-half inches long, and one-half inch wide. On microscopic examination it was seen that this exudate was in the meshes of the pia, and not on its surface, and running through the middle of this patch was a thrombosed pial vein. The pituitary body was necrotic.

The lateral sinus, the remainder of the meninges, and brain were normal.

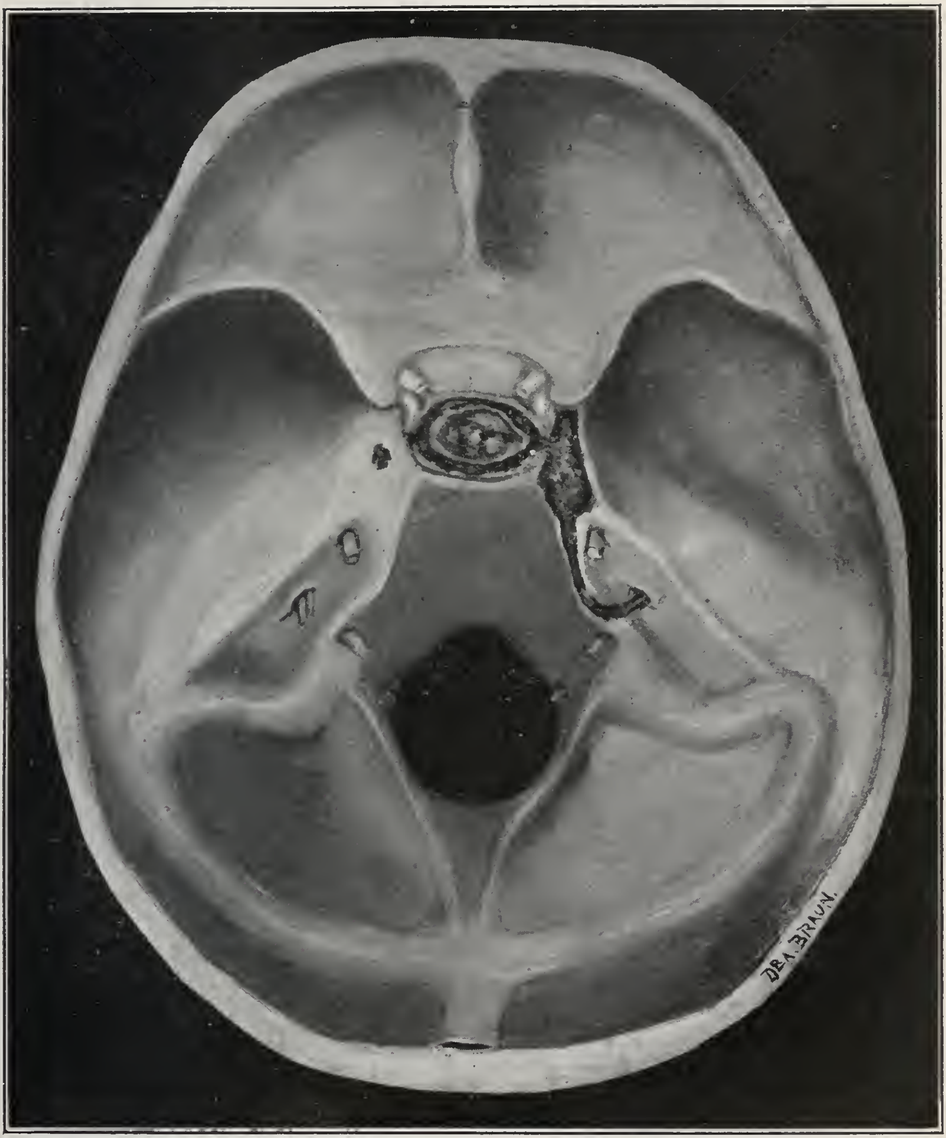

FIGURE 1.

Condition Found at Autopsy.—Pus in right internal auditory canal, clot in right inferior petrosal sinus, both cavernous sinuses and circular sinus.

XXIX.

NASOPHARYNGEAL MYXOSARCOMA: SEVERAL OPERATIONS AND FINAL SPONTANEOUS RECOVERY. UNDER OBSERVATION FOR TWENTY-SEVEN YEARS.*

By E. Fletcher Ingals, M. D.,

Chicago.

In November, 1883, A. P., a boy thirteen years of age, came to me from a distant State complaining of obstruction of the nares and nasopharynx and frequent bleeding, which had been troubling him for three months. There was nothing in the previous history to account for the disease, but twenty-seven years later he told me that a sister had died of cancer. The temperature was 99.5° and the pulse 115. The general condition was good, though he had been coughing for about three weeks. There was loss of nasal resonance in the voice, and I found the right naris filled by a growth which came within half an inch of the nostril, and the septum crowded so far over as to close the left naris; the nasopharynx was also filled by the same growth. The fauces and larynx were normal, also the chest and abdominal organs.

By repeated operations I succeeded in removing practically all of the growth from the naris and nasopharynx, but there was a part which extended behind and somewhat beyond the pterygoid process which could not be removed. A portion of the growth was submitted to Dr. C. E. Webster for microscopic examination, and he reported it to be a small celled myxosarcoma, the malignancy of which would depend upon the softness of the tumor and the rapidity of its growth. He thought this was liable to recur locally, or secondarily in the lungs or liver. As it had grown to this size within about three months, it seemed to be a very unfavorable case. I used the cold snare many times and cauterized with the galvanocautery, and at other times with chromic acid some parts which could not be removed. I inserted into parts of the growth several times a pointed aluminum probe on which chromic acid had been fused; this was left in position about ten minutes until the tendency to bleed disappeared. If the probe were withdrawn at once there would be excessive bleeding. The most interesting of these operations (the seventh and eighth) were made about a month after the patient first came under my observation, and were described in his record at that time as follows:

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*Presented to the American Laryngological Association, May 25. 1914

At various operations with the postnasal snare, using steel wire, with the ends run through catheters passed through the naris and brought out of the mouth, I had removed a considerable part of the nasopharyngeal tumor; and by the snare used through the nostril I had removed nearly all of that part of the tumor that could be secured from the front. I had also used gouge forceps through the naris to remove certain parts of the nasopharyngeal growth; but this caused profuse bleeding. The snare was no longer effective because it could not be made to hold on to any part of the tumor. There remained of the tumor a mass filling one-third of the nasopharyngeal cavity and three-quarters of the posterior part of the right naris. This mass grew from the right side and the posterior and superior surfaces of the nasopharynx, and was also attached to both sides and the roof of the right naris for about 1 cm. forward from the posterior edge of the septum. Below this growth I had secured by the previous operations an opening at the lower part of the posterior naris about one-fourth the size of the choana. There was no part of the growth to which a snare could be applied. In this emergency I improvised from a piece of brass tube a trochar bent to fit the upper and posterior wall of the nasopharynx, through which I passed a sharp pointed copper wire stilette. Passing this trochar through the naris I forced it through the growth at the upper outer angle of the posterior naris and brought it down into the pharynx. Then I passed through it and brought out of the mouth a No. 1 catheter. The trochar was then removed, the catheter being left in position. A similar operation was done on the inner wall of the naris, the catheter being left in position. Another catheter was then passed through the opening below the growth. I now had in position three catheters, two at the upper angles and one below. Through the upper two I passed the ends of a steel wire, the loop of which was subsequently brought in through the mouth to cut off the base of the growth which was attached to the roof of the nasopharynx. One end of each of two other wires was carried from the mouth through the same catheters, and the other end of both of these through the lower catheter, the loops being brought in through the mouth to cut off the upper, outer and inner attachments of the growth. The ends of each of these wires were secured in snares and they were tightened, but having in some way become crossed, one wire cut one of the others off, and as a result only one side of the growth was completely severed. Subsequently I repeated the operation to cut through the top and inner side of the growth, but all the wires were then carried through the canula of a single ecraseur, and as this was tightened both cuts were made completely at the same time. When the piece of tumor thus cut off had been removed, it was found that the nasal cavity and vault of the pharynx had been freed from the tumor, only very small portions remaining at the upper part of the vault and on the right side of the posterior part of the naris.

Soon after this, he went to his home for a few weeks, but returned in December, 1884. He reported that he had been very well and had suffered no more bleeding. He appeared to me about the same as when I last saw him. I found the remnants of the tumor in the nasopharynx slightly increased in size, but the portion in the right naris had grown forward nearly an inch. There was also swelling noticed in the right cheek, which came from a portion of the tumor that might be felt and moved beneath the zygomatic arch. This portion was apparently about an inch in its longest diameters and about half an inch in thickness. It could readily be felt from the mouth just above the level of the upper teeth. The patient's general condition was very good, and he was able to breathe through the nose fairly well. I tried electrolysis on the tumor, placing the negative pole inside of the mouth and the positive pole on the cheek. This was repeated five or six times, but appeared to have very little effect on the size of the tumor. I then injected the growth several times with twenty minims of a three per cent solution of carbolic acid, and continued frequent electrolysis on the nasal portion of the growth.

The galvanocautery was also used frequently to destroy portions of the growth that could not be reached in any other way without causing excessive bleeding, but even with the cautery bleeding was sometimes severe. At one time, when the growth had not been touched for several weeks, severe bleeding occurred during the night.

The patient remained in the city this time until May, 1885, seeing me occasionally, sometimes six or eight weeks intervening between his calls at my office. During this time the late Prof. Gunn attempted to remove the tumor from the right cheek under the zygomatic arch by cutting through the cheek from the angle of the mouth back to the ear, but such severe bleeding occurred that he had to desist and close up the wound without having accomplished his purpose. Then I learned that the boy was running around the city with idle boys and getting into mischief, and I advised his father to take him home. At the time he left the city it is noted that the posterior part of the right naris was about nine-tenths occluded by the growth.

My next note was fourteen years later, March 29, 1899, when it was stated that after going home the tumor grew so that it made the right cheek very prominent and destroyed the vision in the right eye, and for a couple of years he could not breathe at all through the nose.

Afterward it appeared to have gradually atrophied until he could breathe through the nose very well; however, the septum had been crowded so far to the left, where it remained, that it four-fifths occluded that side. Both turbinate bodies on the right side had disappeared and an enormous cavity remained where the tumor had been. At this time the patient was suffering from rheumatic pains which kept him under my observation for about two months.

He called to see me again six years later, complaining only of considerable secretion in the nasopharynx. The tumor had long since completely disappeared, but the deformity of the cheek and the absence of vision in the right eye continued. I saw him again in 1911. He was then in good health, excepting a slight asthmatic condition. The prominence of the right cheek, the bending of the septum to the left, the large cavity in the right naris, and the blindness of the right eye were the same as at the last visits.

XXX.

HOW THE PATIENT CAN HELP HIMSELF IN CASES OF CHRONIC CATARRHAL OTITIS MEDIA.*

By Stephen H. Lutz, M. D.,

Brooklyn,

This paper is a plea for the better instruction of patients suffering from chronic catarrhal otitis media. They should be instructed and advised in reference to hygiene and diet, methods of ventilation and manner of dress. A careful history of their general condition as well as their ear condition should be obtained. Patients must be impressed with the necessity of giving to the aurist detailed information in regard to their general health. It requires more than a number of visits to the office of the aurist and the after a time more or less perfunctory inflations for patients to obtain the help they are seeking.

Otologists are agreed that diseased conditions of the nasopharynx and nose and the consequent involvement of the eustachian tubes are the cause of ear troubles in a large percentage of cases, but in many cases we must go far away from the upper air passages in seeking for our cause. The other regions of the body must not be forgotten. The proper circulation of healthy blood, the function of the liver and kidneys and a healthy large intestine mean much to the patient in our prognosis. Aneurism, tuberculosis, syphilis, the onset of acute disease, anemia or drug habits must all be remembered. Careful observation and examination and a clear reasoning mind have helped many an aurist over the hurdles that threw his predecessors into the ditches of despair. The otologist who does all his work with a Politzer bag, catheter or other instruments frequently finds his patients missing when he needs them most.

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*Read before the meeting of the American Otological Association, May 26, 1914.

Woakes was not so far off in his original writings on the association of ethmoiditis with middle ear disease. At the time it was considered preposterous, but in following years the influence of diseases of the nose and nasopharynx on the middle ear was more plainly shown until Wilhelm Meyer clinched the argument when he published his paper on "Adenoid Vegetations in the Nasopharynx."

Abnormal conditions in the nose or sinuses, with the consequent poor drainage, extension of inflammatory processes from these to the tube mouth, obstruction by the presence of adenoid masses or enlarged posterior ends, or by cicatricial remains due to attempts at removal of adenoids, mucus deposited in the fossa of Rosenmüller, paralyses of, or other interference with the action of, the levator palati and the tensor palati, are all causes of the deafness which we call chronic catarrhal otitis media.

A deviated septum may not always interfere with inspiration or expiration, nor will a diseased accessory sinus of itself directly always cause trouble, but either of these causes will accumulate or retain mucus, and the effort to dislodge the accumulations will almost certainly involve the ear sooner or later. Any blocking in the nose or nasopharynx interferes with the normal action of the tubopalatal muscles, and therefore the ventilation and drainage of the tube is impaired.

Pressure at localized points is a cause of circulatory disturbance, particularly in the venous return from the middle turbinate and eustachian tube, which empty into the veins of the pharynx, and by this imbalance congestion of the tube lining and of the mucous membrane of the drum cavity results, with swelling of the lining and diminished caliber of the tube. Later on, as a result of impaired ventilation and drainage, exudates form and are retained in the tube and in the cavity of the tympanum and also in the area surrounding the tube mouth. This exudation and congestion in the nasopharynx causes the formation of masses of mucus which are hawked backward or blown forward. These acts cause rarifaction or pressure in the nasopharyngeal cavity; exhausted or rarified air in the nasopharynx allows greater pressure on the drum from without, and imbalance is the result; this difference in air pressure is exerted on the tubes and on their control muscles. The trouble begins at this time from the frequent efforts to clear the posterior nares. Violent blowing of the nose, the suction and pulling to aspirate the mucus backward, cause the muscles to stretch, recover, stretch again, and this is done repeatedly. Gradually the tube mouth is distorted and becomes a receptacle and retention chamber for infectious laden mucus to further the process already begun.

We have all seen cases in which the effort to dislodge a mass of mucus in order to clear the breathing passage was the beginning of the ear trouble for which the patient sought help.

We know that careful, well done nasal surgery will often stop the progress of the ear involvement by providing a fairly natural open air channel with a fair return of muscular control of ventilation of the tympanic cavity.

In various textbooks we find advice as to methods of clearing the nose. Sprays, douches, blowing the nose with one nostril closed or drawing the mucus back and ejecting it are advised. All of these methods have each and every one had many victims in the past.

Let me beg of you to carefully instruct your patient how to blow the nose. This seems like a simple thing to dwell upon, but it will be found by careful practice to be the best means of helping the patient to help himself and retain whatever improvement he may have gained by treatment.

We can trace almost all of our suppurative cases to one of these methods, because by pressure against the tube mouth, infected material enters the tube and sometimes the tympanic cavity as well.

I instruct the patient to blow gently both nostrils at once into a handkerchief held about an inch away from the nose. The fingers must not compress the nose at any place over the yielding soft parts of the nose, in fact they must not touch the nose at all.

I instruct my patients to place the thumb on one side and the forefinger on the other side, at least an inch away from the side walls of the nose, thus supporting the handkerchief like a bag instead of crumpling it in a wad and pressing firmly up against the nose, as the average person does. When a clear passage of air can be had, stop blowing. There may be some mucus left in the nose, but not enough to block the nose and interfere with ventilation.

Some persons do better holding the handkerchief in two hands, one on either side, resting against the cheeks.

Whatever way is used, do not allow the least pressure on the nose to interfere with both nostrils being cleared at one and the same time. If the mouth can be slightly opened while blowing there cannot be any amount of back pressure toward the eustachian tubes.

XXXI.

TWO CASES OF SARCOMA OF THE DURA MATER ARISING IN THE VICINITY OF THE MASTOID PROCESS, WITH VAGUE SYMPTOMS SIMULATING MASTOIDITIS. OPERATION IN EACH CASE FOLLOWED BY ULTIMATE DEATH.*

By John F. Barnhill, M. D.,

Indianapolis.

Mrs. C. F. B., aged thirty-six years, a woman of good build, consulted me at my office June 24, 1912, concerning a pain in the right ear and the right side of the face. She stated that she had suffered some pain in the region of the ear for ten years, and that two years ago the pain was intense in the ear for a short time; that there was then a slight aural discharge which soon ceased, after which the pain was relieved, but that there was still a feeling of soreness and occasional sharp pain deeply situated in the ear, but not behind the ear or over the mastoid. Three or four months ago the pain in the ear and over the face gradually increased and was always worse at night, preventing sleep during the morning hours. The character of the suffering frequently seemed neuralgic, starting in the face and radiating toward and into the ear. She could recall no injury to the face, ear or mastoid region. She had never suffered from dizziness, nausea or general headache.

On objective examination it was observed that the patient was anemic, and looked worn and debilitated from the long continued suffering. Strabismus of the right eye was present, due, it was stated, to a convulsion which took place two years previously. No pupillary disturbance. Slight tenderness over the right side of the face, and on deep pressure over the mastoid. Hearing almost absent in right ear, having been lost, according to the patient, about ten years ago. Bone conduction absent. The appearance of drum membrane was almost normal.

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*Read before the meeting of the American Otological Association, May 26, 1914.

Appearance of nostrils quite normal. Good nasal breathing. No evidence of pus in either nostril or of any sinus disease on either side. Pharynx and nasopharynx normal. Tonsils moderately enlarged with deep crypts containing caseous material. The teeth contained many fillings, but none were openly decayed or sensitive. There was no rise in temperature or increase in pulse rate. As a result of this examination I could make out no definite ear disease, but was satisfied that the cause of the pain was not in any of the accessory sinuses. The presence of enlarged and infected tonsils, and of the many fillings in the teeth, suggested, more than any other visible condition, the possibility of origin in these structures. I emptied and disinfected the tonsil pockets and advised that the patient consult a qualified dentist with the view of ascertaining positively whether or not the pain arose in the teeth.

I heard nothing further from the patient until August 1, 1912, when it was stated in a letter that Mrs. B. had continued to suffer without intermission, the former pains being now quite unbearable. She had recently consulted Dr. Albert E. Bulson, a thoroughly competent otologist, who, after careful physical and laboratory tests, had, according to the letter, stated to her that a mastoid abscess was present and that an immediate operation was imperative. I next saw the patient August 6, 1912, at which time there was nothing new worthy of record other than the continued evidence of persistent acute suffering. I was unable after this second examination to determine with any degree of certainty the cause of her trouble, and so stated. It seemed possible that a latent and anomalous mastoiditis was present, but such a diagnosis could be based only on experience with other somewhat similar cases of mastoid anomaly, and not on facts gained from the present examination. The patient had, however, fully resolved to have any operation performed that promised relief, and was even willing to undergo exploratory operative measures. Before undertaking surgical measures I advised a complete medical examination, and Dr. Chas. P. Emerson, accordingly, went thoroughly into the case on the same day. In addition to my own findings, Dr. Emerson ascertained that there was no general cause for the head pain, that there was leucocytosis (14,000), and that there was slight paresis of the seventh nerve. He further states that "some features of the case would lead one to suspect a central meningeal trouble involving the sheaths of the seventh and fifth nerves and secondarily involving the mastoid." And further in the report adds: "We feel that the mastoid on the right side would better be explored."

August 7, 1912, an exploratory mastoid operation was performed. More extensive incisions than usual were made, and the bone of the mastoid region was widely exposed by reflecting the tissue flaps thus outlined. The bone looked softened and at one point, about an inch posterior to the external meatus, granulation buds were beginning to protrude through to the outer surface. On chiseling away the surrounding osseous structure a large granulating mass was encountered which occupied the entire cellular environment backward, inward and upward. When well uncovered the attachment of this mass was found to be on the dura, over and posterior to the sigmoid sinus, and over the posterior lower portion of the temporosphenoidal lobe. In removing it rather severe hemorrhage resulted, not from the tumor itself, but chiefly from the sigmoid sinus, the wall of which was perforated in the process of separation.

As a result of the operation the patient was greatly but not entirely relieved from the former pain, the wound healed rapidly and closed completely within a month, enabling the patient to return to her home, some considerable distance. Within a few weeks the pain began to increase in severity, strength and mentality gradually failed, and death occurred March 1, 1913, as a result of some "brain trouble." I never saw this patient after October 1, 1912, but it was reported to me that there was no external evidence of the return of the growth.

Laboratory examination of the specimen removed showed endothelial sarcoma.

PATHOLOGIC REPORT.

The pathologic report on specimen removed from case of Mrs. C. F. B. was made by A. C. Shipp, Pathologic Department, Indiana University School of Medicine, as follows:

"The section sent me for diagnosis shows masses of endothelial cells arranged in irregularly shaped concentric whorls about atypically formed blood vessels. The cells vary in shape from that of a typical endothelial cell to almost spindle shape in some whorls, while in others the cells are in appearance and arrangement very similar to the cells of the round celled sarcoma. There is a slight connective tissue stroma connecting the whorls, and the entire growth is very vascular. The picture as a whole is that of a malignant neoplasm, which for want of a better name we call 'endothelial sarcoma.'

"In explanation of the above, we will say that, according to Mallory, 'An endothelioma is a tumor of mesenchymal origin of which the cells tend to differentiate into flat endothelial cells, and to line vessels, cavities and surfaces.' Of like origin is the sarcoma. The endothelioma, according to Adami, are transitional growths (Adami and McCrea, page 227), and their cells revert readily to the sarcomatous type. The same author gives the following description of the dural endothelioma:

"'Endotheliomas are firm, flattened, or nodular tumors, originating from endothelial cells covering the dura, or possibly from the lining membrane of the vessels of the subdural space. The growth readily implicates the piaarachnoid, and may finally extend to the brain, which it compresses or invades. Irritation of some kind seems to be a potent factor in the causation. We have twice seen, postmortem, cases in which a spur of bone projecting from the inner surface of the parietal bone formed the center about which an endothelioma developed. Occasionally these tumors spring from the outer surface of the dura and erode the calvarium, finally appearing externally. Microscopically they present the appearance of richly branching and anastomosing bands of flattened cells, tending to be spindle shaped, with a characteristic concentric arrangement. It is not infrequent to meet with tumors showing histologic transitions from the endotheliomatous to the sarcomatous type' (See Vol. 1, page 824)."

Case 2.—Sarcoma springing from the dura of the mastoid region. September 5, 1909, I was called to see R. S., of Centralia, Missouri, on account of mastoid disease. I found patient in bed and much prostrated. He was twenty-eight years old, tall, well proportioned and of athletic appearance. He gave a history of pain in the ear and mastoid some weeks previously, the pain having grown steadily worse until surgical means of relief were sought and a simple mastoid operation was performed in the University hospital at Columbia, Missouri. The mastoid wound had never completely healed, the pain continued to grow worse, and weakness of the patient increased to the date of my visit. I found the mastoid wound dressed and the head bandaged in the usual way. On removal of this dressing a large, soft mass protruded from the mastoid wound which, judged by appearance, was a hernia of the brain. There was much infiltration of the skin and other soft structures around the protruding mass, the adjacent cervical glands were moderately enlarged and tender, and thin pus bathed both the tumor and its environment. The patient had always regarded himself as an exceptionally strong man, had never before been ill, and could recall no injury to the mastoid or ear, which latter had never suppurated. Pulse and temperature were only slightly disturbed, there was no marked headache, and no vomiting or other symptom of intracranial pressure. I secured a specimen of the growth and the laboratory report was that it was undoubted sarcoma.

The patient was brought to the Methodist Hospital, Indianapolis, where I operated September 8, 1909, removing the growth, adjacent bone and soft structures to what appeared to be healthy tissues on all sides. Although removed thus widely there was evidence of return of the tumor with the first repair granulations, and within two weeks the mass was large enough to protrude beyond the skin level. Death took place from meningitis three weeks after the last operation.

The base of the growth was firmly attached to the dura, with which it was so intimately amalgamated that no line of demarkation could be seen. Considerable hemorrhage resulted from the separation of the tumor, but fortunately the sinus was not torn open in the dissection.

In a partial search of recent otologic literature I find only one other very similar case reported, that of Dr. Otto Glogau, of New York. (ANNALS OF OTOLOGY, RHINOLOGY AND LARYNGOLOGY, June, 1911.) In case one, the history of which was quite complete, there was never any positive evidence previous to the operation which in any way indicated the exact nature of the diseased process. There was not in my opinion any positive evidence of mastoiditis or even of mastoid involvement of any kind. The symptoms were very similar, however, to cases of anomalous mastoiditis I have several times seen and operated, and it was my expectation that this case would be of that type.

I was unable to get a complete history of the second case, but believe from an analysis of the statements by the wife that the early symptoms pointed more directly to the mastoid, and that it was early diagnosed as mastoiditis without aural discharge.

REPORT OF A CASE OF SINUS THROMBOSIS WITH EXTENSIVE OPERATION ON THE SINUS AND JUGULAR VEIN, IN WHICH SYMPTOMS OF CAVERNOUS SINUS THROMBOSIS LATER DEVELOPED, FOLLOWED BY APPARENT RECOVERY, BUT WITH ULTIMATE DEATH.

I was called to the home of Mr. B., aged fifty-five years, on account of persistent, severe headache, November 10, 1913. The family physician stated that this complaint had been made for several weeks, but that the headache had grown much worse in the past two weeks, and for the past few nights had been so severe as to require the hypodermic use of morphin. He further stated that he found on the most careful examination no good cause for the pain, but suspected that a chronic though slightly discharging ear might be responsible. Patient gave a history of moderately good health all his life. Right ear had discharged for more than forty years, but he had never in any way suffered from it. Had never had any treatment for the ear and did not know the cause of onset. During the past three months has had occasional pains in right side of the head, but only in the past two weeks had he felt the need of the services of a physician. The pain was more severe over the temple than elsewhere, and never centered in or around the ear; was worse at night. The discharge from the ear had never been profuse, and he had scarcely thought of it lately. Had had no vomiting, was not much dizzy, and no falling or whirling sensations. Did not think he had had any chill during present illness. On physical examination patient appeared very ill. Sat erect with difficulty, on account of extreme weakness. Temperature 100°, pulse 95. No paralysis; no stiffness, swelling or soreness of the head or neck. Pupils normal and reacted equally to light. No tenderness to pressure over the head, but slight tenderness to deep pressure over mastoid. The external auditory meatus contained a small amount of partly dried, foul-smelling pus. Drum membrane wanting in posterior superior quadrant. No granulations, no cholesteatoma. These symptoms, taken together with the fact that no general disease could be discovered to account for the present illness, seemed to justify the diagnosis of chronic mastoiditis with acute exacerbation and probable intracranial complication, and I therefore advised that he be brought to the hospital for a radical mastoid operation. This advice was followed, and the classical radical operation was performed November 11, 1913. The mastoid was eburnated, the mastoid antrum was small, and there were no pneumatic cells in the mastoid process. A small amount of pus was found both in the antrum and tympanum. No necrosis or fistula of the inner table was anywhere found. Following this operation the patient's condition continued same as before, and a few days' careful observation by the nurse showed several occasions when there were chilly sensations but no distinct chill. The temperature chart pointed rather conclusively to infection from some source.

Blood count was made and found to be as follows: white blood count, 23,900; red blood count, 3,800,000; polymorphonuclear leucocytes, 91 per cent; small round celled lymphocytes, 5 per cent; large round celled lymphocytes, 4 per cent.

Never any symptoms of marked intracranial pressure. Still no general disease was found to account for the trouble. At the end of a week the symptoms, while not wholly typical of sinus infection, we believed to originate in that vessel, and a sinus operation was therefore advised and performed. When extensively opened it was found that the sigmoid sinus contained no trace of blood, but was filled with liquid pus into the lateral sinus and almost to the torcular. The bulbar end was therefore filled with a strip of iodoform gauze and the jugular vein was exposed and was found full of pus at the upper end, and contained infected, but not broken down, clots toward the clavicle. The jugular vein was ligated below near the clavicle and above close to its exit from the skull. The branches were followed up and ligated and the intervening vein removed. The bulb end of the sigmoid sinus was then curetted and an iodoform wick was inserted deeply toward the bulb. The bulb itself was not uncovered or curetted. The neck wound was completely closed except for the exit of a large cigarette drain. The mastoid and sinus wounds were packed and left widely open. The patient's condition at the end of the operation, while not critical, was not good.

Following this operation the pain was lessened, and the temperature curve followed the normal line very closely for about one week, after which it again became somewhat irregular, but did not rise above 100° until the tenth day. From the twentieth to the thirtieth day there was again septic temperature. The appetite was never satisfactory, sleep was sometimes impossible, and there was occasionally a sort of muttering delirium lasting only for short periods. Patient sat up at the end of ten days and desired much to return to his home. At this period there appeared, with great suddenness, a swelling and protrusion of the right eye. (Figure 1.) Separation of the lids revealed no inflammation of the eye, and vision was normal. Eye grounds were not examined. All symptoms pointed to thrombosis of the cavernous sinus, and although the progress of the case had seemed favorable till now, the appearance of this new complication gave cause for an unfavorable prognosis. On this account, and on account of the earnest pleading of the patient to go home, he was allowed to do so, accompanied by the same nurse who had been in constant attendance. At this time the wound in the neck was completely healed and the mastoid and sinus wounds were nearly dry, healthy in appearance and almost closed. I saw the patient no more, but received frequent letters from the attending physician, stating that the progress of the case had become favorable, the temperature gradually returning to normal, the protruding swollen right eye having returned almost to normal at the end of a month, and that the strength and general well being of the patient were apparent. On January 15, 1914, recovery was so far advanced that the nurse was dismissed. The patient was then able to sit at table with the family at meal time, and on nice days had walked some in his farm yard. Death occurred suddenly on February 24th at this time of expectant recovery, the cause probably being a large embolism. No postmortem was made, consequently neither the exact cause of death nor the state of the obliterated sinuses could be known, but it was believed by all who saw and studied this case that all the larger cranial sinuses on the right side of the head were at one time blocked from the general circulation.

The chief lesson in this is found in the fact that a running ear may continue a very long time without apparent harm, but that suppuration, though slow, is almost certain in all cases to end in disaster to the patient.

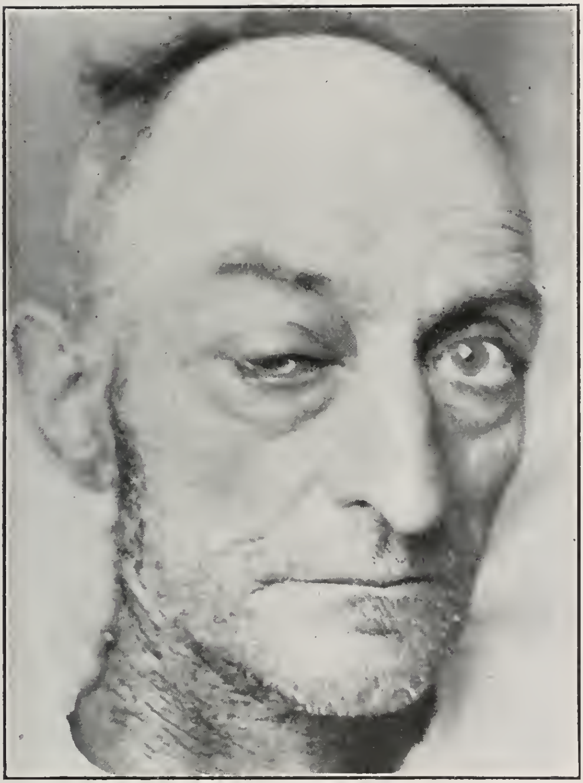

FIGURE I.

XXXII.

A CASE OF LATENT MASTOIDITIS COMPLICATED BY TOXIC AND IRRITATIVE CEREBRAL SYMPTOMS, ACCOMPANIED BY BLINDNESS AND A STREPTOCOCCEMIA CAUSED BY TRAUMA—OPERATION—RECOVERY.*

By Samuel Kopetzky, M. D.,

New York.

F. D., aged twenty-seven years, is married; has two living children, and never had any serious operation except for an otitis acuta on the left side, a year or so previous to the beginning of this history. Her personal and family history is negative.

Her illness originated in a slight blow over the left supraorbital region, three weeks before her admission to the New York Red Cross Hospital, on June 3, 1913.

The trauma was slight, and for two days afterwards she appeared and felt normal. Then edema showed itself over the injured area, although no skin had been broken, and she began to run a low temperature, ranging about 100°. Headaches began at this time.

Three days later the edema spread to the opposite side and began to clear away. Her body at this time was covered with an urticarial rash. Dr. David J. Hyman was in charge of the case, and he called in Dr. Frank Van Fleet to examine the eyes.

The eye grounds were found normal at this time, and I was called in to see the patient, to determine whether or not the frontal sinuses were involved. These were found normal. The patient continued to run a temperature, and the intensity of the headaches increased. On May 31st I saw her again; the edema over the right eye, and also over the other eye, had entirely subsided, but the headaches were more intense. Previous to this Dr. Abram Jacobi had seen the case. On June 1st delirium appeared. The delirium would alternate between periods of excitement and depression. She was subject to moaning, then crying out violently, with periods of excited and irrational talk. She also began to complain of not seeing well. On admission to the hospital, examination, undertaken by Drs. Israel Strauss, Hyman and myself, brought out the following facts, which were later again demonstrated to Dr. Elsberg when he was called in consultation:

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*Presented before the Section on Otology of the New York Academy of Medicine, December 12, 1913.

EXAMINATION.

Small erythematous, punctate rash on outer surface of both right and left thighs. Vasomotor irritability of skin not marked. Heart and lungs negative. Spleen not palpable. No rigidity of neck. No Kernig. No loss of power in hands or legs. No ataxia of upper extremities. No paralysis of muscle.

Eye grounds.—Right eye, veins somewhat engorged. Disc somewhat swollen, evidence of optic neuritis present. Left eye, condition similar to the other, but less pronounced. Conjunctiva injected and slight ptosis in eyelid.

Reflexes.—Both abdominal reflexes were absent. Knee jerks: right, present; left, more active than right. Achilles present, more active on the left side. Plantar reflexes more active on the left side. Ankle clonus absent right side. Babinski present on the right side; absent on the left. No Oppenheimer reflex on either side.

Blood pressure 100 mm.

Sensorium.—Confused. Patient answered questions correctly when spoken to and aroused. At the time of examination she appeared exalted. She could distinguish coins. In reading, she read a few words; repeated them and then added sentences brought out by the association of thought in the subject matter she was reading. In repeating what was read, she elaborated her sentences. (Writing specimens submitted.)

When given a sentence to write, she elaborated but did not finish the idea she attempted to write.

Ears showed nothing of moment. No discharge.

Lumbar puncture showed cerebrospinal fluid under increased pressure. The fluid was clear, reduced copper, but contained a moderate amount of lactic acid. No bacterial growth.

Her blood culture, taken at this time, as reported by Dr. Pease, showed a streptococcus mucosus.

The Wassermann was negative.

A streptococcic vaccine, prepared by Prof. Elser of Cornell, was subsequently administered intravenously by Dr. Strauss during the course of the after-treatment.

X-ray plates of the frontal sinuses, the ears and the head, generally, were attempted, but were not successfully carried out, on account of the difficulty of having a bed-ridden patient lie quiet. Gradually she could only see light, blindness was partial.

On account of the mental symptoms presented it was determined to do an exploration of frontal lobe, and this was carried out by Dr. Elsberg. No abscess was found, although several punctures were made, thoroughly searching the lobe.

The dura, the muscles and the skin were sutured and a bandage applied. She recovered from this operation, but the mental symptoms continued, and for a few days after the operation she ran a temperature between 103° and 104°, going as high as 104 4/5° the third day. The pulse, during this high temperature, remained relatively low; namely, from 88 to 104.

A second blood culture again showed a positive growth of the same organism. A third blood culture, taken after the fourth injection of the vaccine, was sterile, but by that time the other symptoms had subsided.

The dressing of the wound in the left temple was left in my care, and on removing the bandage on the fourth day a discharge of pus was found coming from the left ear. The mentality meanwhile was clearing. The smear and culture of this discharge showed a similar organism to that found in the blood.

The patient during her rational moments complained of pain in this ear, although examination did not reveal any of the classical signs of mastoiditis. But on June 19th the radical mastoid operation was undertaken, with a view to exploring its condition and exploring the temporosphenoidal lobe.

This operation was performed by me. The mastoid process was found eburnized and contained no gross evidence of pus. The tegmen was found intact. I opened the tegmen and found normal dura. The temporosphenoidal lobe was then searched in the usual manner, but no abscess was found.

Patient came out of the anesthetic, gradually became conscious and the mental symptoms slowly disappeared. She was discharged on July 1st, and subsequently returned for the usual postoperative dressings. The rest of her recovery was uneventful.

During the entire course of her sickness, in addition to the injection of the vaccine, she received medication consisting of various nerve sedatives and urotropin, in five-grain doses, every two hours during the entire twenty-four hours.

The case is interesting because of:

1. The insignificant incident which started the train of symptoms.
2. The symptom of brain abscess. The interference with the association fibres, causing suspicion of an abscess in the frontal lobe; then, later, in the silent area of the temporosphenoidal lobe.
3. Positive blood culture—streptococcus mucosus.
4. The blindness, with ptosis on left side.
5. The late involvement of the middle ear.
6. The remarkable recovery from all symptoms.

XXXIII.

(1.)

SINUS OPERATION; RESECTION OF INTERNAL JUGULAR VEIN; PNEUMONIA. METASTATIC ABSCESSES IN ANKLE JOINTS. RECOVERY.*

(2.)

SINUS OPERATION; LIGATION OF INTERNAL JUGULAR VEIN; SHOCK DURING OPERATION; PROLONGED CONVALESCENCE.*

By M. D. Lederman, M. D.,

New York.

(1.) This little girl is a rather healthy looking specimen to present after the serious experience through which she has passed. At the very onset of her search for surgical relief, complications arose. While on her way to Lebanon Hospital, in an ambulance, there was a collision with another vehicle and she was thrown into the street, but fortunately was not seriously injured. She was brought into the hospital for acute mastoiditis, complicated by sinus thrombosis and jugular involvement, following a suppurative otitis media. A brief recital of the case will show how much a sturdy child can endure and yet survive.

On the 10th of March, 1913, Goldie G. was admitted to the hospital. She had previously been treated at home, where the ear drum had been twice incised by the family physician. She was subsequently treated by continual douching, until the disease showed further extension, when the doctor referred the case to the hospital. Earlier on the same day she had been taken to a prominent special hospital, where the ear was examined and the report was made that the condition was not sufficiently important to keep the child in the hospital. When seen by me on the second day after admission, there was some tenderness over the antrum, bulging of the drum, and retarded drainage.

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*Presented before the Section on Otology of the New York Academy of Medicine, December 12, 1913.

A liberal incision was made through the drum, with the usual irrigation after-treatment, but the mastoid symptoms progressed. Two days later the child was again operated upon, the sinus being explored on account of the septic temperature (as it fluctuated from 98° to 106.4°). A parietal clot was removed, followed by some bleeding from the bulb and free bleeding from the upper portion of the sinus. As the temperature still persisted, the child was given antistreptococcus vaccine, but without the desired effect. Three days after the previous operation the conditions indicated jugular involvement. The child had a decided chill, with typical septic temperature, reaching 106.4°, and sweating. There was distinct tenderness along the outer border of the sternomastoid muscle. Ligation and resection of the internal jugular vein were clearly indicated.

As she was brought to the operating room (March 17, 1913) the little one had a severe chill and was quite cyanosed. An examination of the chest showed involvement of the right lower lobe, posteriorly. Under existing circumstances it was deemed hazardous to administer an anesthetic, so the patient was returned to the ward and palliative treatment given. As the septic manifestations continued—another chill, high temperature and sweating—it was thought that the little one would succumb to the progressive infection unless the same was checked. On the following day I resected over two inches of the internal jugular vein, though the physical signs of the chest showed the presence of a pneumonia at the right side, posteriorly. The first ligature was applied as near the clavicle as possible; the second one above the facial vein. The other venous branches were ligated and a gauze pad was introduced beneath the jugular vein to protect the underlying tissue before resecting it. In cutting through the vessel a white clot was observed, filling its lumen. My impression at the time was that the clot extended beyond the lower ligature, but in order to get below this point the clavicle would have had to be resected. After this intervention no further chill was recorded. The temperature assumed a more regular type, remaining around 104° to 105° for five days. Up to this time two doses of streptococcic vaccine were given hypodermically. As the pneumonic infection improved the fever gradually subsided for a few days, when it suddenly jumped to nearly 105° seven days after the jugular resection. Pain and temperature, with swelling in the region of both ankle joints, were noted. As the mastoid and neck wounds were doing nicely, we felt that the rise in temperature was due to metastasis. Wet dressings were applied, but the parts remained exceedingly painful, every movement of the feet causing the little one to cry out with pain.

Finding that the temperature had resumed its septic character, with fluctuations from 100° to 104°, Dr. A. Hyman, of the surgical division, incised both ankles. A considerable quantity of pus was evacuated, but the joints themselves were not involved. The bacteriologic examination of the pus showed streptococcus infection.

Improvement in the symptoms continued for six days, when another abscess of the left foot was opened. The temperature, at this period, was fluctuating between 100° and 103°. Another dose of streptococcus vaccine was injected. No further complications appeared until April 20th, when the patient complained of severe pain in the right thigh. The temperature at this time touched 103°. We anticipated another metastatic abscess, but, fortunately, the tenderness at this site disappeared under the wet dressings. In two days the fever dropped below 101°, and remained so until May 1st, when it touched 102°, after being around the normal mark for three days. Another collection of pus was found in the left foot and was incised.

On May 10th the young lady was discharged from the hospital. The mastoid and neck wounds had healed kindly quite some time before, but the ankle abscesses required further attention. The parents were anxious to have their daughter at home, so permission to leave was granted. Dr. Klein continued the necessary treatment at home, and the little one was confined to her room for fully a month longer. During that period the temperature went as high as 105°. After she was able to get out of bed, it was two or three weeks before she was able to walk properly. To see her at present, none would suppose that she had passed through such a serious and painful experience.

The differential blood count always showed good resistance, which corresponded with the ultimate clinical result. Though a number of blood cultures were taken the reports were all negative. Unfortunately, the section of vein which was removed, together with the thrombus, was placed in alcohol, and so transported to the pathologic laboratory. Consequently, no culture was obtainable.

One of the interesting features in this unusual case is the clinical fact that a rather lengthy operation was performed, without untoward results, in the presence of an existing pneumonia. Urotropin in ten grain doses, well diluted in water, was given every two hours for over two weeks. When symptoms of vesical irritation appeared the intervals of administration were lengthened, but the drug caused no other unpleasantness. What definite effect this medication exerted upon the septic process can only be judged empirically. It was surprising that the dosage given caused so little disturbance. During the continuance of the disease the child was taking alcohol in the form of eggnogg, six ounces every two or three hours, alternating with two drams of whiskey. Later on strychnin and tincture of ferric chlorid were given. At no time did the urine show any kidney involvement.

(2.) The second case is that of a little girl, six years of age, who was admitted to my service at Lebanon Hospital, on February 7, 1913, with symptoms of mastoid involvement, following an acute suppurative otitis media (right ear) of one week's duration, secondary to a coryza. The drum had ruptured spontaneously twenty-four hours after the onset of pain in the ear, which was accompanied by fever and chilly sensations. The child was fretful and apathetic, and the conditions prompted the parents to bring her to the hospital for treatment.

The child had had measles, followed by whooping cough, a year or so previous to admission. There was also a previous history of jaundice, with several attacks of epistaxis. The right ear showed a bloody purulent discharge, with tenderness and redness of the mastoid process. The temperature was 100.6°; pulse, 106; respiration, 26. Physical examination showed the liver to be enlarged and palpable below the costal margin.

On the following day, February 8, 1913, the usual mastoid operation was performed. Considerable disease of the bone was found, together with unhealthy granulation tissue. Pus was present in the cells of the antrum and tip. The sinus was uncovered, but macroscopically did not appear to be diseased, so no further exploration was attempted. Three days later the temperature gradually reached 101°, then suddenly jumped to 104° in four hours, with two remissions to 102°. During the morning hours of the fourth day the fever dropped to 99.2°, followed by a chill, and the temperature then climbed to 105° in the course of the next twelve hours. That same afternoon I explored the lateral sinus, and, although but a slight change was noticed in the color of the vessel wall, a thrombus was found extending toward the lower end of the sinus. This obstruction was removed, followed by free bleeding from the bulb and from the upper portion of the vessel. As no local symptoms were observed at this time along the course of the jugular vein or in the neck, no further intervention seemed to be indicated. Consequently, no attempt was made to ligate or resect the vein, as we felt that the cause of the continued sepsis had been removed.

Following this procedure the temperature dropped to 102° in eight hours, where it remained for twelve hours without fluctuations. At this time a blood specimen was taken, which remained sterile after fifty hours of observation. Dr. Fridenberg examined the child's eyes on February 14, 1913, and found both discs decidedly pale, soggy, and somewhat prominent. The outlines were obscured, veins very tortuous, and the entire retina was markedly hyperemic, with two small capillary hemorrhages.

The patient was very restless, cried constantly, and was awake the greater part of the previous night. As her general condition was growing worse, though the temperature curve showed no distinct fluctuation, and no chill was recorded after the exploration of the sinus, it was thought best to ligate the jugular vein to obviate, if possible, any further extension of the infection. The result of the eye examination prompted this conclusion, without delaying for further definite indications. It was impossible to differentiate acute local tenderness along the course of the vein, on account of the child's restlessness and irritability. During the afternoon of the 15th the temperature reached 103.2°, and about ten o'clock that night we attempted to ligate and resect a portion of the vein. After some difficulty the vein was found. It was collapsed and very small, and during the attempt to separate it from the vagus and carotid artery the patient stopped breathing; and it was only after several anxious minutes of artificial respiration and hypodermic medication that breathing and circulation were restored.

Under the circumstances no effort was made to resect the vein. Two ligatures were applied—one near the clavicle, and the other higher up. The presenting tributaries were tied off, and the wound was closed as rapidly as possible, a small drain being placed in its lower angle. The patient was removed from the operating room in an unfavorable condition. Following the jugular ligation the child had a very restless night, and was uncomfortable for twenty-four hours, though the temperature gradually came down. She received liquid nutrition every three hours, in the form of whiskey, milk and eggnogg. Urotropin was also given, every two to four hours, as a prophylactic measure, for about three weeks, without any discomfort.

The neck wound became infected—probably from the sloughing portion of the jugular vein—and had to be packed in the usual manner until healed. No further complications appeared, with the exception of an acute inflammation of the auricle on the opposite side, which took on an erysipeloid appearance; but this soon subsided under ichthyol and boric acid dressings. This condition was due to traumatism, as the little one frequently scratched her ear, though no suppuration of this side was seen at any time.

She was able to be out of bed on March 19th, and was discharged from the hospital on April 20, 1913, two and a half months after admission.

The seeming torticollis which exists is not due to any contraction of the sternomastoid muscle, nor to any adhesions of the scar and neighboring tissue. She can rotate her head when her shoulders are steadied, and, under orthopedic instruction, this unpleasant sequela is improving nicely. It probably resulted from the fact that the child always kept her head to the opposite side and feared to change her position on account of pain during and after the dressing.

This case shows that we may anticipate a favorable termination of a jugular infection by a simple ligation of the vein without prolonging the surgical technic incident to its removal. I am inclined to believe that the handling of the vagus in this case accounted for the unpleasant experience encountered.

Good hearing has remained in both the cases presented, and I feel that the results in both children are very fortunate.

XXXIV.

FURTHER REMARKS ON THE USE OF NITRATE OF SILVER APPLIED WITHIN THE MOUTH OF THE EUSTACHIAN TUBE FOR THE RELIEF OF TINNITUS.*

By William C. Braislin, M. D.,

Brooklyn.

The following notes aim to elaborate certain points of a paper read before this society two years ago on the use of silver nitrate applied within the eustachian tube for the relief of tinnitus, especially as to technic and results.

TECHNIC.

Though medicaments have been applied to the interior of the tube by the syringe, bougies and other methods, the manner of application found by the writer to be the simplest and most generally useful is by a cotton tipped wire. The wire employed is composed of two thin silver strands twisted firmly into one. This wire gives the proper strength, resilience and elasticity needed for the purpose, and was suggested, I believe, by Dr. Sidney Yankauer, and made by Tiemann.

The small bit of cotton for carrying the medication is wound on one end of the wire firmly and smoothly. In winding on, the bit of cotton is laid against the wire, and the wire is then rolled toward the right, as in driving a screw. The wire is likewise rolled in the same direction when within the eustachian tube if this is found necessary to facilitate its passage, and for surmounting folds or ridges of mucous membrane within the tube, when present. The size of the cotton pledget wound on the end of the wire is rarely more than double the diameter of the wire; but in marked swelling at and about the mouth of the eustachian tube, larger pledgets are used for application within the trumpet-like expansion of the tube only. The deeper applications of the small sized pledgets are reserved for subsequent applications. The fibers of cotton projecting beyond the end of the wire are bent over to mark the end of the wire, and are then trimmed off smoothly with scissors in order to prevent the projecting fibers, unsupported by the wire, from doubling within the tube. The cotton pledget is then tested to see that it cannot be pulled off the wire, but is not dipped into the solution until after inflation of the tube, just before the wire is introduced into the catheter.

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*Read before the meeting of the American Otological Association, May 26, 1914.

The strength of silver nitrate solution employed is usually twenty grains to the ounce (four per centum), though a strength of eighty grains to the ounce has been used when the application is not to be repeated within a week or longer.

REMOVAL OF PLEDGET AFTER USE.

If the wisp of cotton is moulded on the wire as firmly as it should be, it cannot be pulled off, and is only with difficulty trimmed off with scissors curved on the flat. It is most easily removed from the wire by burning in the alcohol flame.

Under this treatment the wires may become bent or brittle. Bends and angles are readily removed by passing the length of the wire held at a slight tension slowly through the flame. As soon as a wire shows signs of becoming brittle, it is discarded.

RESULTS.

I need hardly say that we may expect to obtain no relief from tinnitus due to lesions of the auditory nerve or of the central nervous system by this method. Congestion and swelling of the tubal mucous membrane, so generally accompanied by tinnitus, seem to me to be more rapidly relieved when, in addition to the other generally employed measures, local applications of silver are made. Operative measures increasing the patency of the posterior part of the nose sometimes alone give prompt and permanent relief of tinnitus, especially the removal of spurs causing pressure on the opposed turbinates.

Digestive, circulatory and general diseases, if present, are factors which nearly always play a part in producing or aggravating tinnitus; yet the middle ear disease once started, no matter by whatever agency, requires, as a rule, active, even vigorous treatment directed toward restoring the normal patency of the eustachian tube.

XXXV.

TEMPOROSPHENOIDAL ABSCESS SECONDARY TO CHRONIC SUPPURATIVE OTITIS MEDIA—OPERATION—RECOVERY—RADIOGRAPHIC FINDINGS.*

By J. M. Ingersoll, A. M., M. D.,

Cleveland.

The patient was a boy, fourteen years old. He had had a chronic suppuration in the left ear for three years. On November 20, 1913, he was brought to Lakeside Hospital. His mother said that six days before he had fallen to the floor unconscious and had remained so for several hours. After that he had had repeated attacks of vomiting and had complained of severe headache and some dizziness. He was examined by me soon after admittance to the hospital. There was a foul purulent discharge from the left ear, and the posterior canal wall was prolapsed; no nystagmus, no strabismus, pupils equal and reacting normally, eye grounds normal. He was very restless and irritable, and his cerebration was sluggish. His temperature was 97.4° and pulse 65. The hearing in the right ear was normal, and in the left ear it was fifteen one-hundredths. Lumbar puncture and blood count were negative.

A stereoscopic radiograph showed a cholesteatoma filling the antrum and extending backward and downward over the sigmoid sinus. The two vertical semicircular canals showed very distinctly. The symptoms, of course, suggested a brain abscess, but we were unable to locate it in the radiograph at this time.

A radical mastoid was done, the cholesteatoma was removed, and as the sigmoid sinus had been exposed over an area about two centimeters long and one centimeter wide, by pressure necrosis from the cholesteatoma, it was thought that perhaps this was enough to account for the symptoms of brain irritation.

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*Read before the meeting of the American Otological Association, May 26, 1914.

For three days following the operation the pulse and temperature were normal, and the brain symptoms improved. On the fourth day the temperature was 102°, pulse 110, there was a paralysis of the left external rectus muscle, ptosis of the right upper lid, and a beginning optic neuritis. The patient was much more irritable and complained constantly of severe headache. At times he was partially unconscious.

On account of these symptoms a second operation was done immediately. The mastoid incision was opened, the dura exposed over the antrum and incised, and a brain knife inserted upward and slightly backward for three centimeters. About two ounces of foul, thick pus were evacuated, and the cavity was lightly packed with iodoform gauze.

After the second operation the patient began to improve. The first dressing was done on the fourth day, and from this time on the recovery was uneventful.

The hearing now (February 16, 1914) in the left ear is twenty-two one-hundredths. The paralysis of the external rectus muscle has almost entirely disappeared, there is no ptosis of the lid, and the eye grounds are normal.

One week after the brain abscess had been operated upon a second stereoscopic radiograph was made, while the gauze packing still extended up into the abscess cavity. This was done in order that we might locate definitely the abscess cavity in the radiograph and then study the first radiograph. With the aid of the second radiograph a more careful study of the first one shows a darkened area in the region where we now know the abscess cavity was located. This dark area begins over the roof of the middle ear and the antrum, and extends upward into the brain, ending in three finger-like projections. We feel very confident that this shadow was caused by the brain abscess, and that our failure to recognize it before the first operation was due to our lack of experience in interpreting the radiographs of a brain abscess.

We believe that we will be able to recognize and outline fairly accurately brain abscesses as we gain experience in the interpretation of stereoscopic radiographs of the mastoid.

XXXVI.

DIFFUSE SEROUS LABYRINTHITIS COMPLICATING ACUTE PURULENT OTITIS MEDIA.*

By Ernst Danziger, M. D.,

New York.

The lines of indication for operation in diffuse labyrinthitis complicating chronic otorrhea are at present clearly drawn, and we all realize that a diffuse labyrinthitis followed by complete loss of function carries with it the imminent danger of purulent meningitis or abscess in the posterior fossa. No one will hesitate under such conditions to drain the labyrinth and, if necessary, the subdural spaces.

It is different in cases of diffuse labyrinthitis complicating acute middle ear suppurations.

The Vienna school advocates the labyrinth operation when there is complete loss of function. It is on that account that I report three cases of this type which have recovered without operation, with complete loss of function of the cochlear apparatus, but with good compensation of equilibrium. In my opinion, we have to differentiate between labyrinthitis as a very early complication, within a day or two of the onset of the acute otitis, without temperature or meningeal irritation, and labyrinthitis occurring after some weeks, together with bone complication of the mastoid process, with temperature and headache. The former are of the serous type, the latter, in a large proportion, of the purulent type. In the former any operation is contraindicated; in the latter, where there is complete loss of function, the labyrinth operation is decidedly indicated. The report of my cases includes only cases of diffuse labyrinthitis occurring as an early complication of acute otitis media.

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*Presentation Report of Cases before the Section on Otology of the New York Academy of Medicine, December Meeting, 1913.

When I presented these cases at the New York Academy of Medicine, one of the gentlemen said in the discussion that the labyrinthitis might have been due to a faulty technic. Every otologist with a large experience of paracentesis sees a number of these cases, in proportion to the amount of clinical material seen by him, so that if they are due to any fault, it is owing to some abnormal anatomic condition of the middle ear, in which case every one is liable to see the same thing occur in his own cases. Be that as it may, one may draw his own conclusions from the following cases:

Case 1.—Miss M. H., twenty-six years of age, school teacher, singer, came to my office on October 4, 1913, suffering from a severe pain in her right ear, less so in the left. She displayed the typical objective and subjective signs of an acute otitis media in the right ear. The left drum was retracted, and the blood vessels along the long process of the hammer were injected. Paracentesis of the right tympanic membrane was performed immediately. In the afternoon of the next day I was called to her home by the attending physician. The patient was suffering from an intense vertigo, and when attempting to sit up she vomited and perspired. She had a pronounced nystagmus toward the left side, especially when looking toward the right. The pointing test established the fact that the finger deviated to the affected side, opposite to the direction of nystagmus; no caloric reaction on the right side. Cold water in the left ear diminished the spontaneous nystagmus, neutralizing it; hot water increased the nystagmus. Tuning forks were not heard by the affected ear, either by air or bone conduction. She lateralized the tuning fork toward the left ear. She was deaf to voice (with the Bárány noise apparatus in the left ear). There was no headache or temperature.

She was kept in bed in a darkened room, instructed not to turn her head, or to attempt to sit up. She took food while lying on her left side, for there was no nystagmus when looking toward the right. There was a slight serous discharge from the ear. Eleven days later I tested her in my office. The perforation in the drum had healed and the tympanum looked almost normal. There was complete deafness on the right side. Tuning forks were lateralized to the left ear. She was still unsteady on her feet, with a tendency to fall toward the affected side, especially when she stood on one foot. Nystagmus was still present when she looked toward the left side. The turning test showed no reaction after ten turnings toward the left side (test for right labyrinth); and an after-nystagmus of about fifteen seconds after ten turnings toward the right side. Caloric test on the right side negative.

At another examination, two weeks later, she showed complete loss of function of the cochlear apparatus, but the turning test showed already a slight after-nystagmus when testing the right labyrinth. The patient was steady on her feet, but when dancing she still loses her equilibrium at times.

Case 2.—Mr. H. W., twenty years of age, student of art, contracted, after a plunge in a swimming tank, a left-sided purulent ear inflammation, for which he was brought to me during the second week of November, 1910. I performed an immediate paracentesis in the afternoon. During the night symptoms of labyrinthitis—vertigo, vomiting and perspiration when trying to sit up or when turning his head—made their appearance. I saw him the following afternoon, when the symptoms of labyrinthine irritation had been already displaced by symptoms of loss of function. There was no headache or temperature. He complained of dizziness when looking toward the healthy side. On lifting his head he vomited and perspired. He had a tendency to fall toward the affected side; he had a decided horizontal rotatory nystagmus toward the unaffected ear; no caloric reaction on the left ear. There was complete loss of hearing to tuning forks and voice; he lateralized toward the normal ear.

After being kept in bed for two weeks he was able to get around again; his spontaneous nystagmus was still present, any quick turning of the head would cause vertigo. When walking he still had a tendency to fall toward the affected side.

An examination three years later shows the following results: Ten turnings to left, testing the normal right labyrinth, show an after-nystagmus of about fifteen seconds' duration; ten turnings to the right, testing the affected labyrinth, show also fifteen seconds' after-nystagmus. We have here the typical compensation, as described by Ruttin, with shortening of the after-nystagmus on both sides. As in rotating we start the labyrinthine fluid in both labyrinths, the after-nystagmus is caused by the sum of the reactions of both organs. If one is not functionating, that one factor is missing, and therefore the resulting after-nystagmus is shorter. The caloric test is negative in the left, and normal in the right ear. He is still deaf in that ear and lateralizes toward the normal ear.

Case 3.—Mr. I. M. Seen by me in the summer about two years ago, suffering from an acute otitis media of the left ear; temperature of about 102°; drum bulging, red, and very painful. Paracentesis was performed immediately. He was left in the care of his physician. I did not see the patient again for about two weeks. He was then brought to me, led by a relative. He was staggering, with a tendency to fall toward the affected side. He gave the typical history of having passed through a diffuse labyrinthitis, with vertigo, vomiting, and so on. His ear was still discharging; there was no headache or fever; no pain over the mastoid or cortex. He had a complete loss of all labyrinthine functions.

I saw him last four weeks ago, when he brought another patient to my office, and subjected him to a thorough labyrinthine operation. He was absolutely deaf to forks and voice in the affected ear. He lateralized toward the healthy ear. Caloric reaction negative on the left ear, present on the right, although not so marked as usual. Ten turnings to the right produced an after-nystagmus of about twelve seconds; turning to the left, of about fifteen. I am aware that this slight difference is of no practical value, on account of the errors which necessarily must occur during the turning—be it the variation of the speed rotation or a slight modification of the position of the head—but the result shows likewise the compensation, with the shortening of the nystagmus on the unaffected side.

XXXVII.

A CASE OF SIMULTANEOUS BILATERAL CAVERNOUS SINUS THROMBOSIS TWELVE HOURS AFTER A SIMPLE MASTOID OPERATION.*

By Isidore Friesner, M. D.,

New York.

Mrs. A. G., twenty-seven years old, a native of Austria, was seen by me first at her home on Sunday, February 18, 1912. The history which she gave was the following: There had been no previous ear trouble. A week before I saw her she was suddenly seized with pain in the right ear, and after two days the ear began to discharge. The family physician was then called in. During the time that he was in attendance upon her she had more or less constant pain in her ear, but the pain was never severe. The discharge, however, became more and more profuse. There were no chills or sweats, and at no time that he visited her did her physician find her temperature higher than 101°.

On Saturday, February 17th, the patient had a chilly sensation and her temperature rose to 102°, accompanied by intense pain in the ear, mastoid and head. When I examined her she looked very ill, but she was seven months pregnant, had had considerable pain, and had suffered enough loss of sleep to account for her appearance. There was neither redness nor edema over the mastoid. The drum was red, but not bulging, and the canal walls were normal. There was a profuse, thin, purulent discharge, which was without odor. The mastoid was exquisitely tender over the tip, but less so over the antrum and emissary vein.

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*Presented before the Section on Otology of the New York Academy of Medicine, December 12, 1913.

Operation was advised and consented to, and on Sunday afternoon a simple mastoidectomy was done. The mastoid process was of the pneumatic type. The cells were full of pus and granulations (probably swollen mucosa), but there was no bone disintegration. The septa between the cells were firm, and considerable force was necessary to break them down with a curette. At the operation the cells were completely exenterated, but neither dura nor sinus was exposed. The inner table over both was apparently normal. Upon admission to the hospital the patient's temperature was 102°. It remained at about this point until the following morning. Then it began a gradual but steady rise during the entire day, until, at 11 p. m., it had reached 105.8°.

Early on the morning following the operation the nurse informed me that during the night the patient had complained of pain in both eyes, and the eyes had become swollen. When I saw her she complained of intense pain in both eyes, and the eyes showed considerable edema of the lids and conjunctivæ. The bulbar conjunctivæ struck me, particularly, as peculiar, in that there was much chemosis, and the mucous membrane had taken on a translucent, almost transparent, appearance, and looked like a clear soap. During the night she had complained of slight headache, but the severe pain, which she experienced immediately before her operation, had disappeared and did not return.

The edema of the eyes and lids increased during the next two days and there was some exophthalmos, but all the signs were from the very beginning more marked on the left side, the operated ear being the right one. At noon on the day following the operation the patient vomited for the first time, and during the succeeding thirty-six hours she vomited at frequent intervals. Then the vomiting ceased and did not recur. On the day following the operation a blood count was made by Dr. G. Reese Satterlee, who reported as follows: Total leucocytes, 6400; polymorphonuclears, 80 per cent; large mononuclears, 10 per cent; lymphocytes, 4 per cent; transitionals, 6 per cent; eosinophiles, none. Blood very watery. Blood culture was negative. Two days later the blood count showed total leucocytes, 13,400; polymorphonuclears, 85 per cent. Blood culture negative.

From the height of 105.8°, to which the temperature rose the day after the operation, it dropped during the next twelve hours to 102°. At noon of the second day the patient had a severe chill, lasting eight minutes, and within four hours the temperature had risen to 106° and had dropped back again to 102°, without a sweat. From this time on the temperature ran a typically septic course, with chills, but without sweats. The pulse became progressively more rapid and feeble.

The wound was dressed regularly and showed nothing abnormal. A full dressing was done in the presence of Dr. Wendell C. Phillips, who saw the case in consultation with me about fifty hours after the operation. The cavity presented nothing unusual. There were no discolored areas on the inner table over the sinus. The eye grounds were examined repeatedly by Dr. Alfred Braun. They were normal. Believing at first that we might be dealing with some acute local trouble, an orbital cellulitis or an erysipelas, I asked Dr. Dwyer to administer Hiss' leucocyte extract. In all ten injections were given.

There was but one septic metastasis. It occurred at the metacarpophalangeal joint of the little finger, on the left hand, and appeared on the fourth day after the operation. The orbital edema continued unchanged until forty-eight hours before death. Then, within a few hours, the swelling of the right eye disappeared entirely, while that of the left became very much less. Twenty-four hours before death the nurse reported that the patient had a convulsion. During a visit to her I observed one of these convulsions. They were labor pains, and the baby was born several hours before the patient died.

Heart, lungs and urine were repeatedly examined. Nothing abnormal was found. She had an atrophic rhinitis, probably due to chronic sinus disease, and had been advised to undergo some nasal operation, in Vienna, a year before. During the course of her illness further operative procedures were suggested, but were refused. Death occurred on the seventh day after operation. No postmortem examination was permitted.

XXXVIII.

CEREBELLAR ABSCESS.*

By C. E. Perkins, M. D.,

New York.

Cases of cerebellar abscess, while not very uncommon, are always of interest to the otologist, and I therefore take the liberty of reporting this case, treated by me on the service of Dr. Dench, at the New York Eye and Ear Infirmary.

R. A., male, aged thirteen years, came into the hospital on July 1, 1912, complaining of trouble in left ear, with history of attacks of pain in the ear for past six months, associated with a slight discharge which had some odor. Two weeks previously he began to have headaches and pain in the neck and, later, in the arms and legs. He vomited, several times daily, after taking food, was dizzy, and walked with difficulty. The drum membrane was bulging. This was incised, giving some relief.

On admission the facial expression was somewhat dull; slight mental dullness; no aphasia. Pupils equal; react to light; fairly dilated. Frontal headache. Temperature 102.4°. Right ear normal. The posterior wall of the left ear was thickened and red. There was pus over membrana tympani, which was bulging. Myringotomy was performed, accompanied by free hemorrhage.

Physical examination showed lungs normal and evidence of cardiac involvement—probably mitral stenosis. An examination of the aural discharge showed a mixed infection, with pneumococcus predominating. White blood cells, 18,000; polymorphonuclears, 62.8 per cent. Blood culture negative.

Radical operation was done on the following day, July

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*Presented before the Section on Otology of the New York Academy of Medicine, December 12, 1913.

3d. Cortex was hard. There was considerable involvement of the mastoid cells. The antrum and middle ear was filled with cholesteatomatous material. Following this operation the patient appeared much better. His temperature became lower, remaining between 100° and 101°, except for one sharp rise to 105°, which was accounted for by an acute tonsillitis.

On July 7th he complained of headache. Examination of the eyes showed changes in the eye grounds of both sides; slight ptosis in left upper lid.

July 8th, leucocytes, 16,400; polynuclears, 81 per cent.

July 10th, patient still drowsy. No nystagmus. Kernig's sign absent; reflexes normal. Lumbar puncture, 20 cc., was withdrawn under moderate pressure. Widal reaction was negative.

July 11th, more drowsy. Lumbar puncture, 20 cc., was withdrawn under increased pressure. Kernig mildly present. Positive Babinski—more on left side. As there was evidently some intracranial complication, an exploration was determined upon. Accordingly, the dura in the middle fossæ was exposed, both over the floor and externally, in the region of the squama. It appeared normal. A small elliptical incision was made through the dura, and a grooved director, passed in various directions, gave negative results, except when passed directly inward for about one and one-quarter inches. Then there was a gush of cerebrospinal fluid, evidently under great pressure, and in amount about four ounces. As the patient was in poor condition, the pulse being weak and in the neighborhood of 160, further interference was postponed. It was hoped that the evacuation of this fluid might produce some amelioration of the patient's condition. On the following day, July 13th, the condition was not improved. Leucocytes, 27,000; polymorphonuclears, 90 per cent. Blood culture negative. Temperature 103°. The dura was exposed over an area of about two inches in diameter, over the cerebellum, working back from the mastoid wound. At a point one inch posterior to the sinus, a small dural incision was made and pus was evacuated at a depth of about one-eighth of an inch. Nearly a teaspoonful of pus was thus obtained. A cigarette drain was inserted and the wound was packed.

On the following day (14th) the patient seemed clearer and somewhat better. Temperature 102°. At 3 p. m. the wound was redressed and a gauze drain inserted. At 6 p. m. the patient ceased to breathe, although the pulse beat continued, and, nothwithstanding artificial respiration and other measures, the patient died at 6:30 p. m. No autopsy was obtained.

This patient never had subnormal temperature or pulse. There was absence of nystagmus. The caloric reaction was present. The infection probably traveled' from the mastoid internal to sinus.

The presence of ventricular distension as a result of cerebellar abscess is well shown in this case. This point is brought out and emphasized by Dr. Dench in his book on "Diseases of the Ear."

XXXIX.

MENINGITIS WITHOUT DEFINITE SYMPTOMS, OCCURRING LATE IN MASTOIDECTOMY CONVALESCENCE.*

By George E. Steel, M. D.,

New York.

The case which your chairman has requested me to report is as follows:

Joseph J., aged eight years, was treated by the family physician for a pain in the left ear for a period of three days, when he referred him to the hospital for treatment.

He entered the hospital February 28, 1913, and examination showed a typical mastoiditis with ruptured drum membrane. He was operated upon the same day, the usual mastoidectomy being done. The entire mastoid process was full of bloody granulations, and the dura of the middle fossa was exposed for a quarter of an inch. The sinus was not exposed. This was healthy and had no granulations. There was a marked hemorrhagic condition of the whole mastoid. Unfortunately, no culture was taken.

The patient made an uneventful convalescence and was discharged from the hospital eight days after the operation, returning for subsequent dressings. On the 13th of March, five days after his discharge from the hospital, he complained of general malaise, but no pain or discomfort of any kind. On examination his temperature was found to be 103°, pulse 120, and respiration 32. The mastoid wound looked healthy, and did not seem to be the cause of malaise.

His nose, throat, chest and abdomen were examined with negative results, and after consultation with members of the visiting staff of the hospital, and no diagnosis being made, the patient was sent to the ward for observation. The following day, the condition remaining about the same, a blood count and culture were ordered, as well as a lumbar puncture.

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*Read before the Section on Otology of the New York Academy of Medicine, January 9, 1914.

The blood count showed 21 per cent of large and small lymphocytes, and 79 per cent of polynuclear neutrophiles. The following day the report on the spinal fluid was: "Appearance cloudy, copper reducing substance absent; test for lactic acid showed a strong reaction; hydrochloric acid precipitation test for meningitis negative; sediment on centrifuging. There is a moderate deposit, made up almost entirely of polymorphonuclear leucocytes. Scattered through this are many diplococci or short diplobacilli. These are Gram negative, are very small, and are probably the influenza bacillus. Culture negative; blood culture negative."

On the results of the laboratory findings a fatal prognosis was made, but, the child seeming improved, it was difficult to convince the parents as to the gravity of the prognosis.

Three days later a second lumbar puncture was made, with the following results: "Twenty cubic centimeters in two specimens, one of which contained blood: physical character cloudy, but less cloudy than previous specimen; reaction neutral; copper reduction absent; lactic acid, present, marked; albumin moderate; globulin moderate; neutral fat, faint trace; cholin present, more than normal; meningeal index 2:5 (not conclusive). A diplococcus bacterium similar to that previously described, is occasionally seen. Blood count: polymorphonuclears, 53 per cent; lymphocytes, 47 per cent."

The meningeal index, the reaction of the fluid and globulin tests were not markedly positive of meningitis; on the other hand, the presence of cholin in amount more than normal, the absence of copper reduction and the high degrees of lactic acid, with the presence of albumin, makes the diagnosis, from a chemical standpoint, purulent meningitis. I might add that an examination of the eye grounds was negative. From the time of ascertaining the results of the first lumbar puncture the patient was put on five grains of urotropin every six hours. The temperature varied from 103° to 105°, and when the temperature was high he was somewhat restless and irrational. It was three days after the lumbar puncture, or five days after his return to the hospital, before he began to develop clinical symptoms of meningitis, which gradually become worse. Died on March 24th, ten days after admission.

Without the laboratory findings it would have been extremely difficult to have made the diagnosis of meningitis before the late appearance of the clinical symptoms.

XL.

VARIATIONS OF SPHENOID SINUS DISEASE.*

By George M. McBean, M. D.,

Chicago.

In studying the atypical forms of sphenoid sinus disease, we must take into consideration the relations of the sinus to the brain and meninges, to the hypophysis cerebri, to the cavernous sinus and internal carotid artery, to the cranial nerves, to the other nasal sinuses, and to the nasopharynx.

These structures may become associated with the sphenoid in a morbid process due to:

(a) Extension of infection.

(b) To exposure by necrosis of its bony wall from chronic suppuration.

(c) To invasion of the sinus from the cranial cavity—for instance, by pituitary tumors.

(d) To irritation or paralysis of the optic, motor oculi or trigeminus nerves, or the carotid plexus.

(e) To association with the ethmoid in acute and chronic infections, polypi, atrophic rhinitis, and atrophic pharyngitis.

I have a series of more or less atypical cases, three of which went to autopsy. The other six were either seen in consultation with other men, or were sufficiently identified in other ways to make the diagnosis certain.

Case I.—Brain Abscess in Frontal Lobe from Sphenoid Infection.—Arthur B., aged fifteen years, was referred to me in February, 1910, for what had been diagnosed as acute frontal sinuitis, for which he had been under treatment for one month. He was suffering from a severe paroxysmal pain in the median frontal line. His temperature had ranged moderately high for several weeks, although his pulse was very slow.

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*Thesis presented for membership in the Chicago Otological and Laryngological Society, February 17, 1914.

Examination.—No pus in nose; a small ulcer on cartilaginous septum; the region of left sphenoid too tender to probe, even under strongest cocain, and membrane red and granular in appearance; frontals and antra transilluminated perfectly. Ears normal. Eyes showed fair degree of bilateral papillitis, vision good. Reflexes all normal except a marked Kernig. Leucocyte count, 15,000. Skiagram negative. Spinal puncture—clear sterile fluid under pressure.

Consultation with Drs. Chislett and Grinker. Diagnosis: brain abscess in silent area.

Operation February 26th, with Drs. Chislett, Kahlke and Grinker. Opened left frontal sinus (the one supposedly diseased) and found it normal. Exposed and needled brain. Located abscess in left frontal lobe, just over the left sphenoidal sinus. Drained off about two drams of thick green pus. Culture showed diplococci. Progress almost uneventful. Pulse rose to normal; temperature fell; Kernig disappeared; pain cleared up. One month later developed endocarditis, which gradually subsided.

May 3d, two months after operation, pain in head again; Kernig positive, hernia cerebri. Needled brain again; small amount of pus.

May 9th, pain severe; loss of speech.

May 10th, trephined over left Rolandic area. Needled; no pus. Right sided paralysis following.

May 11th, died. Postmortem examination, limited to head, showed large abscess in left frontal lobe, with small dumbbell extremity over sphenoid. Sphenoidal sinus contained gelatinous mucus and a thickened membrane; other sinuses normal.

To my mind this was primarily a sphenoid infection, as shown by the extreme sensitiveness around the sinus, the inflamed granular mucous membrane and the gelatinous mucus in the sinus, postmortem. The brain abscess probably was secondary to the sinus infection, although no direct connection could be found.

Case 2.—Spontaneous Hemorrhage from Diseased Sphenoid.—Miss N., age twenty-eight years, a Swedish masseuse. Had a postnasal catarrh, for which she had received treatment in the old country, but not here. Was awakened one morning by a severe nose bleed. Received various kinds of treatment until evening, when I first saw her. Found her pretty well exsanguinated, with immense clots hanging from both nostrils, and still bleeding.

I removed the clots, but could find no source for the profuse hemorrhage. Packed both sides with bismuth lint, after Freer's method.[1] Was unable to check the bleeding completely. Two days later, as alarming symptoms developed, we exposed both internal carotids, but were unable to check the hemorrhage. She died the next day.

Postmortem showed caries and necrosis of the external wall of the right sphenoidal sinus, and hemorrhage from the internal carotid through the sinus.

The spontaneous hemorrhage emphasizes the danger of curetting this sinus, except on its lower median walls.

This case and the following one I mentioned, by invitation, in the discussion of Dr. Maclay's paper, "The Interrelations of the Pituitary,"[2] before this society in 1911.

Case 3.—Hypophysis Tumor Which Invaded the Sphenoid.—I reported this case by invitation to the Chicago Neurological Society, December, 1911.[3] Dr. Harvey Cushing, to whom I referred the patient, also reports it in his book[4] as Case 11, pages 81 to 86.

Miss S. E. K., age thirty-six years. Refused to give history, as it might prejudice the diagnosis.

Condition March 4, 1910.—Height, five feet, eight inches; weight, one hundred and sixty pounds. Eyes rather prominent; left pupil larger than right. Right eye convergent; outward rotation limited. Vision: right eye, ten-tenths; left eye, eight-tenths. Some metamorphopsia in both eyes. Choked disc, plus 1.00 D. right, plus 2.00 D. left. Visual fields slightly contracted; color fields partly overlapping; natural blind spot slightly enlarged. Postnasal examinaton showed small polypus in right naris, coming from region of sphenoidal sinus, which on probing was found diseased. A tentative diagnosis was made of optic neuritis secondary to nasal sinus disease, with paresis of the right external rectus muscle. Operation advised.

March 16th, at operation, the sphenoidal sinus was found packed with a polypoid mass, curetted and examined. Considered sarcoma and granuloma by different men. Vision and diplopia much improved after operation. After making the diagnosis the patient gave the history which had been previously refused. She had had amenorrhea for eight years without apparent cause, and had gained fifty pounds in the first year following cessation of the menses. About August, 1909, she had acute rhinitis, and all the eye symptoms had dated from that time. The diplopia of recent development was the most annoying symptom. There was a history of frequent, transitory glandular enlargements in various parts of the body, especially the axillæ. There was also a transient, noninflammatory edema of the ocular conjunctivá, which appeared occasionally and lasted a few hours. Within three weeks after the operation the sinus began to fill up again. Drs. Shambaugh, E. V. L. Brown, Fish and Lewy, in consultation, urged further operative measures, which were refused, and patient left the city. November 18, 1910, she returned, showing a paracentral scotoma in the left eye; vision slightly reduced. A mass was projecting from the open sphenoidal sinus. Patient went to California without treatment. In January, 1911, patient consulted a physician in San Diego for severe headaches, accompanied by mental disturbances, transitory loss of memory, and increasing blindness. Potassium iodid had a remarkable effect, clearing up the pain at once. February 21st, returned to Chicago and had a Wassermann test made, which was reported "moderately positive," and the patient was put on larger doses of potassium iodid and daily intramuscular injections of mercury. Skiagrams showed an enlarged sella turcica. Dr. Grinker, in consultation, made the diagnosis of tumor in the region of the sella turcica, with increased intracranial pressure. Patient's vision at the time was further reduced. The form field was not contracted much, but the color fields showed a bitemporal hemichromatopsia. The scotomata were larger than in November. The patient was sent to Dr. Harvey Cushing in Baltimore, April 12, 1911, from whom the following notes were received:

"There is evidence of a large growth or hyperplasia which has done more than merely occupy the sellar region, which has broken through into the cranial fossa itself, as shown by the general pressure symptoms; bilateral choked disc plus 2.00 right, plus 3.00 left; primary optic atrophy; central scotomata; vision low in both eyes. There is increased carbohydrate tolerance; subnormal temperature for some years; low blood pressure; adiposity; dry skin. No acromegalic facies, and no definite bone changes in the hands. Wassermann negative.

"Operation April 20, 1911, sublabial approach, submucous resection of the nasal septum. Removal of large portion of growth from sphenoidal sinus and distended sella turcica."

May 17, 1911, she returned to Chicago, practically blind from the large central scotomata. During the summer the vision failed completely, from atrophy of the optic nerve. The lapses in memory became more frequent, as did the headaches.

She entered the hospital August 10th. Headaches became very severe.

About September 15th the pain suddenly ceased and the mind cleared remarkably, probably from a leak of cerebrospinal fluid. She was comparatively well for a month, then the pain returned and she died October 20th.

The postmortem examination by Dr. Chislett, limited to the brain, showed a large tumor in the sella turcica, adherent to the bone, projecting into the sphenoidal sinuses and involving the left lateral ventricle, which it entered from below, not through the foramen of Monro. Microscopically it showed a hyperplasia of chromophobe elements.

This was the first case in which Dr. Cushing was "able to determine a rational therapeutic dosage of glandular administration on the basis of the established carbohydrate tolerance." Cushing thinks from "later experience that a postoperative radiotherapy might have inhibited the further growth of the lesion."

Case 4.—Acute Infection of Sphenoid with Frontal Pain.—Miss L. S., age seventeen years, had an acute cold in February, 1912, and was referred to me with a diagnosis of frontal sinuitis. No pus visible in nose anteriorly. Much mucopus in nasopharynx. Culture, pneumococci. Transillumination of frontals and antra clear. Patient was in bed, so no skiagram was possible at the time. With Holmes' nasopharyngoscope a small stream of pus could be seen coming from the orifices of both sphenoids and collecting in the throat. The posterior ends of both middle turbinates were pale and edematous. Syme of Glasgow[5] says this edema is characteristic of sphenoid disease, and may be followed by atrophy.

Without the aid of the nasopharyngoscope, I would probably have made an error in diagnosis, as all the pain was frontal, from irritation of the first branch of the trigeminus. The patient recovered under treatment without operation.

Case 5.—Acute Ethmosphenoiditis With Unusual Eye Symptoms.—Miss H. K. had an acute nasal infection in January, 1911, with pus in the superior and middle meati. Her pain was the classical one, back of the eye and in the occiput. Asthenopia was severe. A few days after the onset of the infection the right pupil suddenly became dilated, and this, with the pain, suggested glaucoma, but there was no increase in the tension. In a couple of days this pupil contracted and remained more or less myotic for several weeks, associated with spasm of accommodation.

Dr. C. G. Fellows and Dr. E. V. L. Brown saw her with me, but could find no local trouble in the eye to account for the dilatation or contraction of the pupil. Her Wassermann was negative, and so were her skiagrams.

The infection resisted all local medication, and was finally cured by an autogenous vaccine.

Another unusual symptom in this case was amenorrhea, which began with sphenoid infection and continued until its cure—a period of many months. This patient weighed about two hundred pounds, so I recalled Cushing's dictum to look out for the pituitary in fat amenorrheics, and had a skiagram made showing the sella turcica. This was normal, but I still think that the inflammatory trouble in the sphenoid caused some hypophyseal disturbance producing the amenorrhea.

Owing to the great anatomic variation of the sphenoid in size and shape, as demonstrated by Loeb,[6] Onodi,[7] Syme,[8] Sluder,[9] and others, almost any of the nerves in the lateral wall may be irritated in the inflammatory process. The most plausible explanation I can offer for the behavior of the pupil in this patient is that first the carotid plexus of the sympathetic was irritated by the inflammation, producing mydriasis; later the motor oculi was irritated, producing myosis. I am aware that in streptococcus infections certain changes have been observed in the pupil, but in this case the changes were unilateral, and therefore I believe were due to irritation of the nerve tracts. Baumgarten and Lapersonne are quoted by Onodi[10] as having seen cases of oculomotor paresis and paralysis the result of sphenoid sinus suppuration.

(Sluder[11] also reports two cases recently, since this paper was written, in which dilatation of the pupil was associated with sphenoid disease.)

Case 6.—Chronic Ethmosphenoid Suppuration With Atrophic Pharyngitis.—Miss E. R., age twenty-two years, first seen in February, 1912. For five years had been troubled by large crusts forming in the nasopharynx during the night. The crusts were so tenacious that she removed them with her finger. She had some subjective sense of odor. No other symptoms.

I thought this was a case of Thornwaldt's disease, until with the nasopharyngoscope I found pus coming down the anterior surface of the sphenoid. I could not catheterize the sinus, and she would not submit to operation. This case, with its absence of typical sphenoid symptoms, would almost certainly been wrongly diagnosed but for the help of the Holmes instrument. There was no headache, no apparent nasal discomfort, nothing to be seen in the nose anteriorly. Apparently a case of atrophic pharyngitis—really a case of sphenoid disease. Gruenwald, I believe, was the first to call attention to the posterior group of cells in atrophic pharyngitis cases.

Case 7.—Atrophic Rhinitis With Sphenoid Suppuration.—Miss Blanche B., age twenty-two years. Had atrophic rhinitis and the pain of sphenoid disease back of the left eye and in the occiput. Pus could be seen in the left ostium sphenoidale by anterior rhinoscopy. It was very easy to remove the nasal wall of the sinus for drainage and ventilation, and the relief of pain was marked after healing took place.

I do not know what the ultimate effect on the atrophic rhinitis was, as the patient discontinued treatment after the relief of the headache.

Cases 8 and 9.—Pansinusitis.—Came to me in 1906. Miss A. M., age thirty years, and Mrs. M. A. H., age forty years. Two old cases of pansinusitis which had existed many years. Both had many polypi, and both had pains in almost all parts of the head. The sphenoids were the first sinuses opened in each case, and the relief of the occipital pain indicated its origin. The other sinuses were operated later. Miss A. M. also had chronic suppurative otitis media with cholesteatoma and a polyp in one ear, which I removed. She died in 1912 of pneumonia. Mrs. M. A. H. is practically well.

RESUMÉ.

First, I believe that sphenoidal diseases is much more common than was formerly supposed. This list of nine cases in six years' time in my own practice convinces me of its frequency. With more careful postnasal examinations, especially with the nasopharyngoscope, many such cases will be found. With the routine use of the probe and the catheter more cases will be recognized. The sphenoid is the easiest of all nasal sinuses to catheterize, as a rule.

Headache in my cases was the most constant symptom. Most often it was occipital and back of the corresponding eye. Twice it was frontal (once in brain abscess case). Pain was absent in the atrophic pharyngitis case. The pituitary case had a pain like Casselberry's[12] university professor, "dull and boring, sometimes bursting in the middle of the head." The typical pain in the occiput is very similar to that of eye strain produced by ocular hypophoria, and must be differentiated by exclusion.

The eye symptoms were variable or lacking. In some cases difficulty in using the eyes for near work. In one case inequality of the pupils and spasm of the accommodation. In the brain abscess and tumor cases there was bilateral papillitis, of course, due to intracranial pressure. In none of my other cases was there any fundus change.

Loss of vision in only one case—the hypophysis tumor from involvement of the optic nerve.

Discharge, in one case forming crusts in the nasopharynx, in another, crusts in atrophic rhinitis. In the other cases, of a mucopurulent character.

Polypi abundant in two old multiple sinus cases. Single polyp in brain tumor case.

Subjective sense of odor in only one case—that of atrophic pharyngitis.

Loss of smell in atrophic rhinitis and old polyp cases.

Suppurative ear disease in only two—the hemorrhage case and one of the polyp cases.

Termination.—Three in death, all with postmortem examination, hemorrhage, brain abscess, brain tumor. Two in recovery—acute cases. Three in operation with benefit or cure. One, no treatment.

Presentation of a cast of the left sphenoidal sinus which I made from a skull kindly loaned to me by Dr. Major H. Worthington.

The sinus measured 46 mm. anteroposteriorly, 29 mm. laterally, 15 mm. vertically. There was a lateral prolongation behind the sphenomaxillary foramen.

The right sinus I was unable to cast, but it was only about the average size.

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SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of December 12, 1913.

A Case of Latent Mastoiditis Complicated by Toxic and Irritative Cerebral Symptoms, Accompanied by Blindness and a Streptococcemia Caused by Trauma. Operation. Recovery.*

By S. J. Kopetzky, M. D.

DISCUSSION.

Dr. Strauss said that he would like to refresh Dr. Kopetzky's memory on one point, for, if his own recollection was correct, he had omitted one important feature. Did not the patient have an ear infection some years previously, for the relief of which a mastoid operation had been advised and refused, and which was apparently cured without operation? Apparently she had had a rather serious condition.

Dr. Kopetzky replied that he had reported that the patient had had an acute attack in that ear. He was told that she had had a mastoid infection.

Dr. Strauss, continuing, said that, in interpreting this case, the former attack was a factor of some importance. When he saw the patient, four days after the blow, he had been impressed by the fact that the blow which she had received (which consisted merely of falling on the sidewalk and striking her head against an iron fence) had not been sufficient to cause headache, abrasion, or ecchymosis, and she had paid no attention to it. Two days later the headache commenced, and with that there appeared an edema, which had no redness and was more or less circumscribed in the frontal region, but later advanced to the eye and involved the conjunctiva, so that the eye could not be closed. After a day or two of no temperature she developed an urticaria, while the edema over the right eye disappeared and appeared again over the left, with the same edema of the conjunctiva and with transference of the headache to the left side. Inquiry into the patient's previous history revealed that she had experienced recurring urticarial attacks, evidently being subject to some anaphylactic reaction. Her eye grounds were normal. At that time she was beginning to be incoherent and to cry out, and was restless, but without the presence of any objective symptoms of meningeal irritation. The diagnosis was made that the fall had nothing to do with the condition, which seemed to be the result of a toxemia. Dr. Jacobi had made a lumbar puncture, but the report obtained was not very satisfactory. A day or two later the patient had a sudden rise of temperature (103°), and at that time a small focus was discovered in one of the lungs, such as one might expect with a slight bronchopneumonia. The patient was then removed to the Red Cross Hospital. The temperature continued, and she was delirious and incoherent. She was unable to read or to hold a coherent conversation. About this time she developed a Babinski in the right foot, with loss of right abdominal reflex, and lumbar puncture showed increased pressure of the spinal fluid. The eyes showed the first stages of optic neuritis. Dr. Elsberg, myself, and others felt that the patient might not have a brain abscess, but that, if there were one, the symptoms pointed to the left side—the Babinski and the incoherency would point to the left frontal lobe. It was decided that, under the circumstances, if a surgeon could make an exploration with the least possible damage, it was better to take the risk and do it, than to overlook a brain abscess.

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*See page 391.

The operation was done, the frontal lobe punctured in various directions with negative result, and the patient was not injured. That is the way in which these exploratory operations on the brain ought to be conducted.

Following the operation a blood culture was taken which showed streptococcemia. The culture was taken to Dr. Elsberg, who has elaborated a method of preparing vaccines which is somewhat different from that usually employed, but which has not yet been published, although some of the physicians in the city have used it. This vaccine was given intravenously, administering it every day, starting with 50,000,000.

Dr. Strauss said that, if he recollected correctly, as soon as the vaccine was given the temperature began to fall—if it had not, in fact, begun to do so before the vaccine was given. At all events, the temperature began to fall synchronously with the administration of the vaccine.

It was questionable whether in this case much stress could be laid upon the efficacy of the vaccine. However, the blood became sterile, the mastoid developed, and again, for purposes of safety, the left temporosphenoidal lobe was explored. So we are not certain that the vaccine really had anything to do with the result.

Dr. Strauss said that he was now inclined to believe that his first opinion regarding the case was correct, and that all the symptoms, even the Babinski, were due to the toxic condition. The Babinski reflex has been shown to occur in intoxications, in eclampsia, and even in epileptic convulsions, so that its appearance here, while regarded at the time as possibly pointing to an organic lesion, may have been due to a toxic condition. The further development of the case seemed to confirm this—unless there may have been a latent mastoid process which the blow in some way started into activity.

Dr. J. Guttman said that Dr. Kopetzky had just reminded him that he had seen the patient before. At that time he had found all the symptoms described by Dr. Kopetzky, but had interpreted them differently. As he recalled the case, he had found a swelling under the eyebrow region of the frontal sinus on both sides. This was the only objective symptom. Careful examination showed no ear symptoms; the eye grounds were normal; there was nothing in the nose; no pus anywhere. The subjective symptoms of which the patient complained were pain in the head and some disturbance of vision, which could not be verified objectively.

Dr. Guttman said that the patient's family physician had consulted him, but that he had been unable to arrive at a diagnosis. The patient gave a vague history of some trauma, and it seemed best to keep her under close observation. Certainly Dr. Kopetzky and the other physicians who had charge of the case were to be congratulated upon the fortunate result of their procedure. It was certainly very difficult and almost impossible to make a diagnosis on the conditions presented. The going into the brain and laying bare the frontal lobe, without any diagnosis and without any ill effects to the patient, was a very excellent piece of surgical technic.

It is true that streptococcus mucosus, which is apt to cause all kinds of brain complications, even in quite insignificant otitis, was found in this case, but this alone did not give sufficient reason for entering the brain. The radical mastoid operation, as well as the entering into the temporosphenoidal lobe, without any positive diagnosis, again showed how lucky both the surgeon and the patient were, and both were surely to be congratulated.

Dr. Felix Cohn inquired if there was a radical operation in the sense of the Schwartze-Stacke operation.

Dr. Kopetzky replied that they did not do radical operations for acute mastoiditis, but that this was a radical mastoid operation; that is, a complete exenteration of all mastoid cells and the removal of the bony posterior canal wall to throw the tympanic, antral and mastoid cavities into one connecting cavity. This was done to provide a larger area: to afford access to the cerebrum through the mastoid wound.

Dr. Perkins said that certainly Dr. Kopetzky, Dr. Elsberg, Dr. Strauss, and the others connected with the case were to be congratulated on the recovery of the patient. Some years ago he had reported a case in which the patient had had an acute mastoid, and developed convulsions on the opposite side, beginning at eight o'clock in the morning and continuing to one o'clock in the afternoon, the patient in the meantime becoming comatose and practically in articulo mortis. The temporosphenoidal lobe was explored, on the possibility of a tumor explaining the condition, but nothing was found. There was some flow of blood, but we could not say from what vessels. We thought we had done all we could, and the patient was put to bed. The convulsions ceased, and the patient recovered entirely. We thought that we might have done something that cured the patient.

Dr. Kopetzky, in closing, said that the case would be published in full later, and the various details given which could not be presented in a hasty manner. The frontal lobe was explored because the symptoms seemed to demand it. In order to present the case, some title was required, and he had called it mastoiditis. His own idea was that the infection in the mastoid process was latent. It was not clear what had happened, but if such a case had died without exploration, it would have been ascribed to a brain abscess.

There were only two tangible facts: one, the positive blood culture, and the other the form of mania present, and the fact that a similar organism was found in the ear as was previously demonstrated in the blood. Dr. Guttman had seen the case, and Dr. Frank Van Fleet had examined the patient, and made the same report that Dr. Guttman did. The optic discs were normal, and, later, the optic disc was involved. The progressive condition of the case was striking.

These were the only facts. The rest was theory. We did the best we could, and the patient recovered. Those who saw the case at the time were justified by the symptoms in assuming the presence of an abscess.

(1.)

Sinus Operation—Resection of Internal Jugular Vein—Pneumonia—Metastatic Abscesses in Ankle Joint—Recovery.

(2.)

Sinus Operation—Ligation of Internal Jugular Vein—Shock During Operation—Prolonged Convalescence.*

By M. D. Lederman, M. D.

DISCUSSION.

Dr. Phillips said that he had noted a growing tendency to abandon the resection of the jugular vein. A good many men are now simply ligating, without any effort to resect, and claim that they get as as good results. He himself had not had many cases of late, but the matter was worthy of consideration. Of course, one should ligate low down. He understood that the Boston otologists, almost without exception, ligate without resecting.

Dr. Smyth asked if Dr. Lederman had noted any tangible benefit from the urotropin in this case. He had formerly used it, but had given it up.

Dr. Eagleton said that he had been especially interested in the first case presented by Dr. Lederman, and congratulated the doctor upon the good results he had secured under the treatment pursued. The fact that both hips were involved and not opened, and that the child has free movement of both hip joints, was evidence that the infection was not in the joint itself. Dr. Eagleton then cited a case of thrombosis in a child which was operated upon in the usual way, with ligation of the jugular. Later it had repeated chills, and complained of pain in its foot, and by the advice of an orthopedist an extension was put upon it. Two or three days later the hip was found to have become spontaneously dislocated. There was no evidence of suppuration, and a needle was inserted with negative result. Dr. Eagleton said that he was convinced that the child was septic, and advised cutting into the joint. This was done and pus evacuated. Later the child drew up its other leg and again complained of pain. In two days, while under the same treatment, this joint also became dislocated, and, upon being cut into, discharged pus. After three months of sepsis the child recovered, but with disability of both hips.* Since that time he had seen a similar case of involvement of the hip joint, and had been surprised that another orthopedist should have again advised waiting. He (Dr. Eagleton) thereupon stated that he had waited before in a similar case, and knew what would happen, and advised incision. This was done and serum evacuated. The child was immediately relieved and the temperature went down. The child now walks with a good joint.

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*See page 395.

Dr. Eagleton stated that in all cases of septic involvement of a joint, he now opens the joint immediately. He has done this at least ten times, and there has been complete restoration of the function of every joint opened; whereas, if this is neglected, and there is suppuration, the functions of the joint are lost. We have two conditions of involvement in joints during general sepsis, one a toxic condition, but there is no way of telling whether it is toxic or serous from beginning pus. His own opinion was that every such joint should be opened. If this is done aseptically, there is no danger at all

Dr. Seymour Oppenheimer said that he also had seen a number of metastatic joint involvements. As a rule, the general surgeons are inclined to leave these joints alone, the argument being that there is great danger of infecting a joint that is not otherwise infected. He had also had experience with a case, the facts of which Dr. Eagleton was acquainted with, where he operated on an acute mastoid with sinus involvement. Later the patient developed a swelling of the knee joint. Dr. Oppenheimer advised exploration, but the local surgeon refused, and the patient returned to Newark and was treated there by a surgeon who also was opposed to any interference. Dr. Oppenheimer said that he understood the patient had recovered without surgical interference. Both surgeons contended that they were unable to say that there was a bacteriologically infective process, and were fearful of converting a sterile joint into a septic one. That individual case, of course, proves nothing, but in the large majority of cases that he had seen he knew of but one instance where there was any subsequent lack of mobility following these infections. He had never seen a case of joint infection associated with sinus thrombosis that did not get well. Metastatic infection of the joints is far less serious in its prognosis than that involving other regions. Where a metastatic process involves the cardia or the pleural cavity, the cases invariably die. The joint involvement cases usually get well.

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*Archives of Otology, Vol. XXXIV, No. 6, 1905.

Dr. Lederman had referred to the peculiar whitish formation of the thrombus. That seemed to be characteristic of a sterile thrombus, which probably was the reason why Dr. Lederman could safely ligate above the thrombus; bottling it in, as it were. If it had not been sterile, there would have been a continuation of the septic symptoms. The fact that the blood culture was negative showed that the lower end of the thrombus was sterile.

Dr. Opdyke told of a case along this line which had come under his observation. The patient was eighteen years of age, of good physique, and he had operated upon him for a mastoiditis, the patient making an uneventful recovery. Last year he had an attack in the other ear, from which he slowly recovered and now is in good health. This time, as before, the lateral sinus was close to the posterior wall—not more than an eighth of a inch separating them. The temperature was 106° previous to the operation. Following the last mastoid operation, it being on the left ear, he had an involvement of the left shoulder, left elbow, and left knee. The infection was streptococcic. The joints were not opened at first, but the knee became so advanced that it was operated upon, and the patient has a normal joint. He was in bed for four months, and during convalescence a large amount of vaccines were given, with the result that his high temperature and joint affections were relieved. His hearing is now normal in each ear, and he has perfect use of all his joints.

Dr. Lederman, in closing, replying to Dr. Eagleton's remarks in reference to the joint invasion, said that the joints were not involved in this instance, but that the infection was external to the joint. In reference to letting the joint alone, he thought that was also the idea of the surgeon in attendance—to avoid surgical interference if possible.

He mentioned a case of very profound sepsis which he had presented some time ago, where a jugular resection was done and which developed a septic pneumonia with symptoms of empyema. The surgeon, Dr. Henry Roth, absolutely refused to sanction any attempt at interference, to avoid disturbing nature's attempt at limiting the area of suppuration. This patient also developed a pulmonary abscess, which she evacuated through the mouth. She recovered nicely. In cases where the sepsis is so profound, it is advisable to let well enough alone. He could not say whether or not the thrombus was sterile, as the specimen was spoiled for laboratory purposes. The child apparently had a septic pneumonia.

Replying to Dr. Smyth's query about urotropin, Dr. Lederman said that it seems to be the theory that this drug acts in a prophylactic manner. It was given in pursuance of the teachings of Dr. Harvey Cushing, who claims that it should be given in all cases of cerebral or spinal infection. Personally, he had recently taken it during an attack of coryza, and thought that it prevented the purulent stage from appearing. He was inclined, however, to believe that it did good. It is supposed to act only in an acid medium, not an alkalin one. In the first case, six distinct areas in the feet were opened, and pus was found. It was quite evident that these foci were due to metastasis, as the bacteriologic examination showed the same pathogenic microorganism.

Diffuse Labyrinthitis Complicating Acute Otitis.*

By Ernst Danziger, M. D.

DISCUSSION.

Dr. Phillips said that he had been much interested in the histories related by Dr. Danziger, and had only one criticism to make, namely, that it would be well to change the title of his case report to read "Three Cases of Acute Diffuse Serous Labyrinthitis." None of the cases described were purulent labyrinthitis. They were cases of purulent middle ear disease with serous labyrinthitis, a complication he himself had seen several times, with similar results—all recovered, and with permanent loss of hearing. In most of the cases the temperature never ran higher than 100° to 102°, with excessive vertigo. The pain is not very great. The symptoms are not those seen with diffuse purulent labyrinthitis. Such cases, associated with acute purulent otitis, are almost always fatal. He related a peculiar circumstance which occurred in one of his cases. The patient was a girl, with acute purulent otitis media, and paracentesis was necessary. This was performed by a man of not very great experience, and the vertigo developed immediately after the paracentesis. He had always suspected that the paracentesis knife had disturbed the stapes sufficiently to evoke a serous labyrinthitis.

Dr. Felix Cohn said that we should be indebted to Dr. Danziger for having brought this subject before the notice of the Section. These cases of acute otitis, complicated by labyrinthitis, are of especial interest, not only because they are labyrinthine cases, but on account of their comparatively extreme rarity. In all, the speaker had seen, so far as he could recall, seven cases in about twenty-four years. Dr. Danziger had apparently seen three cases in the last two years, but had not seen any, previously, in about twelve years, so that the statistics with regard to the frequency, with the exception of the law of triplicity in Dr. Danziger's cases, about tally.

In regard to Dr. Phillips' remarks about the possible traumatic origin, due to the paracentesis in Dr. Danziger's cases, in all of which the labyrinthitis apparently occurred after paracentesis, Dr. Cohn recalled such an etiology in some of his own cases; but in these instances the number of cases of otitis, complicated with labyrinthine symptoms, which occurred before the operation of paracentesis, were about equal to those occurring after paracentesis, so that such an etiology could not explain all the cases. Inasmuch as time would not allow him to enter thoroughly upon a description of the cases, he begged the indulgence of the Section to allow him to refer briefly to a few of them.

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*See page 406.

A case occurring in the early '90's was that of a young lady, suffering from an acute left-sided otitis during one of the severer la grippe epidemics. Paracentesis was performed, and four weeks later the patient presented manifest labyrinthine symptoms—vertigo, staggering, etc.—from which she recovered completely in a few days. The labyrinthine symptoms were explained as having been caused by a dislocation of the stapes, due to an acute suppuration, inasmuch as what resembled an ossicle could be seen, for a day, through an intact and otherwise normal drum membrane.

Another case, likewise occurring in the early '90 epidemic, was that of a married English woman, of about thirty, who had been treated by a colleague for an acute left-sided otitis. When the patient was seen by Dr. Cohn, she was suffering from symptoms of vertigo, etc.—doubtless what would today be called a labyrinthitis, though, in those days, it was spoken of as labyrinthine pressure caused by pus accumulation. Paracentesis was immediately performed, followed by amelioration of the symptoms. There was a complete recovery in a few weeks, but with total loss of hearing. A traumatic origin could surely be excluded in both of these cases, as in both the labyrinthine symptoms were present before the paracentesis.

A third case was that of a male, in the twenties, who developed a double-sided acute otitis, requiring double-sided paracentesis, which, in turn, was followed by purulent discharge, and a left-sided labyrinthitis on the next day. Complete recovery. The purulent otitis on the left side was somewhat prolonged, and was accompanied by continuous headaches. The hearing was entirely lost.

Another case was that of a female, alcoholic, forty years of age. This patient had a right-sided acute otitis, accompanied by labyrinthine symptoms and by a facial paralysis, twenty-four hours after the beginning of the otitis. The labyrinthine symptoms, as well as the facial palsy, rapidly disappeared after the establishment of a discharge by paracentesis. The patient, however, developed an acute mastoiditis which required an operation, resulting in complete recovery. It was of interest to note that, after the mastoid operation, about four weeks from the commencement of the otitis, the patient again developed a transient facial paresis, which entirely disappeared in a few days—an unusual occurrence in acute mastoiditis, but of especial interest on account of the paralysis in the beginning of the otitis.

As to prognosis, all the cases observed by the speaker had recovered, with the exception of one case, seen a few years ago, and, were it not for that experience, he would probably never have considered the question of operative interference in these cases. The one fatal case of acute otitis was a fulminating case of pneumococcus otitis, followed by purulent labyrinthitis on the fourth day after the beginning of the otitis, and by a pneumococcus meningitis a few days later, terminating fatally ten days after the onset of the otitis. Up to the time of this case Dr. Cohn had considered the prognosis of these cases to be always favorable. Whether, in view of this experience, in cases of acute otitis labyrinthitis, with complete absence of reaction, he would still hold this opinion, he could not say. He was rather inclined to believe that, in view of this experience, he might possibly be more disposed to interfere than he was before having observed this fatal case. Whether, however, much would be accomplished, even by an immediate operation in these fulminating forms of otitis with labyrinthitis, seemed dubious, inasmuch as the meningitis was probably already present, even if not diagnosticable, and we could hardly operate soon enough, if we operated at all. Fortunately, the fatal cases seem rare—apparently only one in ten cases, adding the two statistics together.

Dr. Perkins said that Dr. Danziger had presented these cases admirably. They did not have much temperature, and, giving them the diagnosis of serous labyrinthitis, would it have been possible that the labyrinth became directly infected from a purulent middle ear? If Dr. Danziger had performed a myringotomy and infected the labyrinth by the operation, he would not have had a serous labyrinthitis, but a purulent one. Dr. Perkins knew of two cases in which this accident had happened, with fatal termination through purulent meningitis.

Dr. Friesner, too, believed that injuries to the labyrinth by paracentesis resulted as a rule in suppurative labyrinthitis. If, moreover, the cases of Dr. Danziger, which were in all probability cases of serous labyrinthitis, were due to injuries caused by paracentesis, the symptoms would have come on at once. There would have been no interval between the paracentesis and the labyrinthine symptoms.

Cases of labyrinthitis complicating acute otitis divide themselves naturally into two groups: first, those cases of labyrinthine involvement which occur early in the progress of the acute otitis media. Dr. Danziger's cases all occurred in the first two or three days. Dr. Cohn's cases, too, occurred in the first few days. Most of these cases are serous, and we consider them so, despite the fact that, occasionally, the functional tests show total deafness and complete loss of irritability of the static labyrinth during the height of the labyrinthine symptoms. We all know of those unusual cases of "otitis cum meningitide," in which the infection spreads rapidly from the middle ear through the labyrinth to the meninges, so that the otitis and meningitis appear almost synchronously. Yet, notwithstanding these cases, the vast majority of labyrinthitides which occur in the early stages of acute otitis media are serous. The cases of the second group come on two, three, four or many weeks after the beginning of the acute otitis, particularly where there are already symptoms of mastoiditis. Often the infecting agent is a capsulated coccus. A labyrinthitis that supervenes under these conditions is almost invariably purulent.

Dr. Friesner said that he must disagree with one statement which Dr. Danziger made. Dr. Danziger expressed a doubt that cases such as he reported would be left to heal spontaneously in the future. Dr. Friesner wished to repeat that these cases are recognized as serous and should be let alone. They will probably recover spontaneously in the future, just as they do now.

Dr. Danziger, in closing, said that he had intentionally left out the word "serous" in describing the labyrinthitis, for he thought that one could recover from purulent otitis also, as in some cases of scarlet fever with a parotitis; and he thought that in chronic otorrhea we sometimes have cases of labyrinthitis purulenta with spontaneous recovery.

Dr. Perkins and Dr. Friesner had referred to the traumatic theory of these cases, and had been such able attorneys that he had nothing to add to what they had said, but he wished to subscribe very heartily to Dr. Friesner's remarks in regard to differentiating between a labyrinthitis which is complicating a purulent otitis media, at an early stage, and a labyrinthitis occurring later. The former is in all probability serous, and will recover spontaneously; the latter, occurring at a time when mastoidal symptoms, especially necrosis of bone, make their appearance, means an extension of the destructive process to the labyrinth, and requires operation.

Cavernous Sinus Thrombosis Secondary to Labyrinthitis.*

By Alfred Braun, M. D.

Simultaneous Bilateral Cavernous Sinus Thrombosis Twelve Hours After Simple Mastoid Operation.†

By Isidore Friesner, M. D.

DISCUSSION.

Dr. Perkins said that five or ten months ago he had seen a case on Dr. Dench's service in the infirmary, which, while not like Dr. Friesner's case, was peculiar in a way. This patient had had a mastoid operation, followed by sinus thrombasis. The jugular was tied, and soon after the eye swelled up and the patient had a cavernous sinus thrombosis on the opposite side. No autopsy was permitted. The question came up as to how the infection could have traveled to the opposite side. There were two opinions on that. One was that it traveled by the way of the torcular; and the other, that it was by way of the inferior petrosal sinus and across to the opposite side, via the transverse sinus.

Dr. Lederman said that there was probably some infection in the large sinuses before it reached the cavernous sinus. As to the findings in these conditions, he thought we did not obtain a sufficiency of autopsies in our fatal cases. In cases that terminate fatally, more autopsy work, in the future, would materially assist in ascertaining the origin and route of these complications.

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*See page 368. †See page 410.

Dr. Perkins said that in those cases in which the cavernous sinus became involved. without lateral sinus involvement. and in which the mastoid process was the cause of infection, the route taken was through the petrous portion of the temporal bone, which was probably pneumatic—the same as we have sixth nerve involvement from suppuration at the petrous tip.

Dr. Friesner said he was aware of the fact that involvement of the cavernous sinus was not necessarily an extension from an inflamed and thrombosed lateral sinus. He mentioned the condition of the bony wall of the sigmoid groove merely as an operative finding. He did not pretend to tell how the cavernous sinus became infected in this case. The infection probably was metastatic. It struck him as worthy of mention that in Dr. Braun's case, from a pathologic point of view, and in his own case, from a clinical point, it was determined that both cavernous sinuses were involved at about the same time. He wondered if this was a common occurrence, for, if it were, the operation of draining one cavernous sinus would be futile.

Dr. Alfred Braun, closing: In answer to Dr. Hays' question, I would like to say that in both Dr. Friesner's and my own cases the diagnosis was very easy. In these cases we are not dependent upon the blood culture and the general symptoms for our diagnosis. The local signs are very marked. With general septic symptoms, proptosis, edema of the lids, and conjunctiva, and paralysis of the third nerve, especially if the condition be bilateral, there can be no mistake in the diagnosis. In contrast to the cases of lateral sinus thrombosis, metastatic abscesses are very uncommon with cavernous sinus thrombosis, which is in accord with the fact that the blood culture is usually negative in cavernous sinus thrombosis.

Cerebellar Abscess.*

By C. E. Perkins, M. D.

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*See page 413.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of January 9, 1914.

Meningitis Without Definite Symptoms Occurring Late in Mastoidectomy Convalescence.*

By George E. Steel, M. D.

DISCUSSION.

Dr. Danziger asked if the nose had been examined to see if there could have been a metastatic process from that source. Six years before he had seen the case of a young girl of thirteen, who suffered from an acute otitis media following la grippe. She ran a normal course for two weeks, and later he was called to the house, when she gave a history of severe headaches and vomiting. The ear showed no signs of mastoiditis excepting that there was a slight tenderness on pressure. She was sent to the German Hospital and a mastoid operation was performed, which showed an osteitis. The blood examination showed a high polynuclear count, and the temperature continued high for another week. Both the typhoid and Wassermann test proved negative, and nothing was found excepting a slightly enlarged spleen. Finally, after a week, she was taken to the operating room for another exploratory operation. The sinus was exposed and found to be normal, as was the dura. The temperature still continued, and a lumbar puncture was performed, which showed a cloudy fluid. The patient died at the end of the second week. An autopsy was performed, revealing a basilar meningitis, and upon opening the frontal sinus it was found to be filled with a mucopurulent secretion. Whether that was a postmortem condition or not, he could not say, but attention should be given to the accessory sinuses in these obscure cases, as being a possible source of infection through the nose.

Dr. Steel, replying to Dr. Danziger, said that he had mentioned that the nose was thoroughly examined and that nothing was found.

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*See page 416.

The Symptoms and Rational Treatment of Relaxed Ear Drums.

Dr. Harold Hays said that when the patient first presents himself, stating that his hearing is gradually diminishing, an attempt is usually made to relieve the condition by some form of massage of the middle ear. There is often an obstruction in the eustachian tube. By these means too great pressure is frequently used, and the drum, being the least resistant part of the ear, gives way.

Too little attention has been paid to the mechanism of the middle ear, and few of us have considered the great importance that is played by the footplate of the stapes and the ligament of the oval window. One does not have to be much of a physicist to realize that it is impossible to have true sound waves conveyed through a drum that is diminished in tension. A relaxed drum will cause a relaxation of the entire ossicular chain, therefore, causing the loss of tension in the ligament of the oval window.

Most patients suffering with relaxed ear drums also are paracutic. This can be accounted for by the fact that in these patients the ligament of the oval window is relaxed, but that when there is a great noise the increased tension exerted causes a tightening of the tensor tympani and stapedius muscles, resulting in a more proper tension being created in the ligament surrounding the oval window.

The treatment which he uses for relaxation of the drum and the ossicular chain is mostly that suggested by Mr. Heath. This consists in making daily applications to the drum, which creates a thickening of the membrane, thus tightening both the circular and straight muscular fibers. As the drum is drawn out there is a tendency for the joints between the ossicles to loosen, with the result that there is more tension put on the ligament of the oval window. The treatment should be repeated daily over a period of four to six weeks, and sometimes it is necessary to repeat this treatment three or four times at intervals of two to three months. The strongest solution used for the application is cantharides collodion. Weaker solutions are made up as follows: to one ounce of water is added one grain of cantharides and one grain of potassium hydroxid. One-half of this solution is poured into a one ounce bottle and made up to the full ounce with glycerin. A similar dilution is made from this for the number three and four solutions in the same manner. One must vary the strength of the applications according to the amount of reaction which he gets. In order to protect the canal from irritation from the solution while the applications are made to the drum, the canal should be wiped out with a salve composed of one per cent of yellow oxid of mercury. Dr. Hays stated that he was not content with applications to the ear drum only. There is often a stenosis of the eustachian tube which must be overcome by proper use of bougies. Under no circumstances should the middle ear be inflated. One should always warn the patient that during the time of treatment his hearing will be considerably impaired. It is most evident that while the inflammatory reaction is going on that very few sound waves can be transmitted through the middle ear.

Dr. Hays stated that he had treated up to the present time about twenty cases in this manner, most of whom showed quite some improvement. He thinks that it is too early to say definitely what the final result in these cases may be, but one thing is evident—that in no case has any harm been done, and all the patients seem to feel better after the treatment is over than they formerly did. He thinks that it is very important to differentiate the various forms of deafness, and that we should not be satisfied that we have attained any result until the patient himself appreciates that his hearing is improved.

DISCUSSION.

Dr. Swain inquired how Dr. Hays decides what is a relaxed drum, and what class of cases he chooses for this treatment. As had most of the other men, he had also read Mr. Heath's paper after a great deal of application, for he was interested to learn what could be done to improve this condition, because when paracusis appears one can generally do very little to relieve the deafness. Furthermore, one of his patients had heard of this treatment, and had urged him to try it. So he selected three cases that had very definite paracusis—which he believed was Mr. Heath's criterion, though he understood that Dr. Hays used it in other instances. These cases had been treated by all the usual methods—the adhesions around the eustachian tube had been removed, the eustachian tube dilated and blown up ad infinitum, and all the results possible had been obtained from these measures. They desired to try this Heath method. In all three cases there was some improvement, though the change was not very great. The patients are satisfied that they are improved, and are rather enthusiastic over the results. In two the noise has entirely disappeared in the ear treated, and he intends to give them further treatment if they desire it.

He could not, however, make himself believe that we have all been wrong all these years in all these cases, and that all the drums are relaxed in the cases that do not improve. In these three cases in which he had tried this treatment, the drums were not definitely relaxed, as he understood it—they were not concave and did not blow out too convex. They were not relaxed in the sense in which Dr. Hays spoke—at least they did not seem so—but they were paracoustic cases, and he felt justified in saying that they had improved somewhat under the treatment. In one instance the drum perforated and the hearing was much improved while the perforation lasted, being three or four times better than before. This case showed the best results of the three. Another case was that of a young woman of twenty-eight, who had had one ear benefited, and she now wishes to have the other ear treated.

Mr. Heath was the first who had ever explained to him the phenomenon of paracusis in logical sequence, though he did not feel sufficiently learned in this condition of the ear to understand all that he says about it or to know whether the premises were correctly taken. It is an interesting matter, and the method is original, and seems to offer some chance of results.

Dr. Swain hoped that Dr. Hays would be a little more explicit in defining the cases best suited for treatment.

Some of the older men may remember that a similar method of blistering was in vogue about 1886, and also a little later it was proposed to contract the drum by scar tissue produced by frequent incisions.

Dr. Craig said that Dr. Hays had spoken to him about this method of treatment about a year ago, at the New York Eye and Ear Infirmary. Since then he has treated three cases in this way. Two of them showed a distinct improvement in hearing, and one of them had a marked tinnitus which had disappeared; but the third case showed the most marked improvement, which is the best argument for the treatment. This patient had been treated by excellent men, and every known method had been tried, but without relief. He had a relaxed ear drum, marked tinnitus and dizziness, and he had tried the usual methods for three months before undertaking this treatment, without any result. Last spring he had three months of this treatment, and was discharged in May, with the hearing and tinnitus better, and the dizziness gone. Previous to that, every known method of treatment had been tried, and this was employed as a last resort. The patient considered that it had done him a great deal of good. When seen last in September, he was in excellent condition. Dr. Craig said that he believed the method would do good in properly selected cases.

Dr. Danziger said that one usually finds associated with this condition a connective tissue formation around the oval window. If one can get enough traction on the stapes to get relaxation of the adhesions, it might be that the treatment would be beneficial in that way, but he certainly could not see how that could come about. He believes that an acute inflammation might soften the connective tissue enough to allow more motion of the footplate of the stapes. But as soon as the inflammation subsides, contraction takes place again, and very likely will leave the ear in worse condition than before. In fact, the pathologic condition present is the result of a low grade inflammation.

Dr. Bryant said that he heartily concurred in what Dr. Hays had said about the efficacy of stimulation in chronic cases of deafness. Stimulation is the only efficacious way of dealing with these problematic cases. Dr. Hays' remarks about the use of the catheter were also just.

Dr. Bryant was not so enthusiastic about the Heath method of treatment as some of the other speakers. He modified his judgment of the method, however, by saying that the cases in which he had tried it were perhaps too far advanced and were not therefore a fair test. Dr. Bryant said he would certainly use the Heath method again if he had a case that did not respond to other treatment.

The difficulty he encountered in the method was the necessity of using very weak solutions on account of the thin cicatricial membranes. In spite of this precaution, after prolonged use without any visible reaction, the thin membrane sometimes melted away. In his opinion the method does not stimulate in the membrane an effort to repair itself.

As to the Heath method of treatment, Dr. Bryant said that he could not report such good results as the other speakers. He had tried it with four very resistant cases, and had no beneficial result at all, though it might be that the cases were not quite a fair test, for the patients were extremely deaf, and from his point of view they were already hopeless. The results showed no improvement in hearing, but rather a slight decrease, if there was any change at all. They were not cases of relaxed ear drums in the sense used by Dr. Hays; but they were old atrophic cases, calcified and cicatrized, so they were not fair testimony against the method, and he would certainly try it again if he had a case that did not respond to other treatment. The difficulty he encountered was that he had to use very weak solutions on account of the thin cicatricial membranes. In spite of this precaution, after prolonged use without any visible reaction, the thin membrane melted away. There was no effort at repair at all.

Dr. Duel said that his attention had been first called to this treatment by a paper received from Mr. Heath himself, and later he heard of it through a patient who had been in London and had received one of these pamphlets. She was a prominent woman and was very deaf, and had been treated by several otologists without any benefit. She had been unable to spend the time in London which was required by the treatment, and begged him to carry it out for her. He was about to undertake it, when he had a conversation with a surgeon who had worked side by side with Mr. Heath in the hospital with which he now had no connection. This surgeon had told him that he had been told of certain cases which had died as the result of the attempt to bring about this inflammatory condition in the ear; and that his reported results were discredited by many of the best men in London.

Dr. Duel said that he was not prepared to say that the results from tightening the ear drum by this inflammatory method were permanent, and he had no intention of discrediting Dr. Hays' report. He simply quoted what he had heard about Mr. Heath's work, and he hesitated about trying it himself on account of this direct report from a gentleman who had worked in the same hospital with Mr. Heath, and the fact that the best men in London thought the method was not of sufficient value to induce them to undertake it. It would seem that there might be some danger in setting up an inflammatory reaction as violent as one would get from tincture of cantharides applied daily, particularly where there was any possibility of the presence of organisms in the middle ear. If one does undertake it, Dr. Hays' directions and his instructions to his patients in regard to the blowing of the nose, should be very carefully carried out.

Dr. Duel said that he himself preferred to wait a few years before trying the treatment.

Dr. Seymour Oppenheimer said that every one was much impressed a few years ago by the marvelous results which Mr. Heath had presumably obtained, and stimulated by that he himself had tried the treatment. In none of the cases in which he tried this treatment were the results beneficial. On the contrary, the patients were subjected to a treatment that was by no means pleasant, the inflammatory reactionary processes were extremely severe, and in all but one case a perforation resulted; in one case there was a severe inflammatory process in the external ear as well, and it was necessary to stop all treatment.

Dr. Oppenheimer said that he would not for a moment question the results obtained by Dr. Hays, and that there are some cases of relaxation of the ear drum where this painting process might do some good. Every one knows of the old practice of painting the ear drum with collodion, which, in occasional cases, proved beneficial.

Dr. Hays, in closing, said that his reasons for wishing to test the results of Mr. Heath's work were that he had been trying to do the same thing, but in a much more dangerous way, by the injection of irritating fluid into the middle ear. In the past two and a half years he has treated twenty cases, and in no instance has he had a perforation of the drum membrane. Many times there was an inflammation of the drum created, with a superficial epithelial scaling and discharge, but no perforation, and in no instance was the drum in a bad condition afterwards. The patient presented at the meeting had been treated with pure cantharides for nearly five weeks, and an examination showed a thickening of both drums, but no signs of perforation. At present she has a severe reaction in the left ear, which probably will subside within twenty-four hours by cleaning the inflamed part and keeping it dry. She is at the stage now where it is wise to discontinue the treatment for two or three months. Once in a while a patient has a nasty blister. Just this morning one of his patients came to him from Philadelphia, where Dr. Hays had placed him in the hands of a competent man. This patient had a bulging drum on the left side, so large that it could be seen without a speculum. Apparently the physician who was treating him had not watched the reaction carefully, and therefore too strong an application had been made. Pricking the blister and wiping the parts dry was all that was necessary.

In reply to Dr. Danziger's remarks in regard to paracusis being due to adhesions, Dr. Hays said that as a rule this symptom is not due to adhesions, but to relaxation of the stapes. Dr. Hays does not believe that where there are strong adhesions anything can be accomplished by this treatment until the adhesions are broken up and the drum tightened.

Replying to Dr. Swain's question, as to what cases should have this treatment, Dr. Hays said that it is difficult to determine until one decides for himself what can be considered a relaxed ear drum. This can only be ascertained by noting the tension of every ear drum through an electric otoscope, and seeing what one would consider a relaxation. Dr. Hays said he hoped the questioners would give this treatment a fair trial, for there are many cases of deafness that are getting worse every year, after having been treated in some other way. If in these cases we find a relaxation of the drum, it is only fair to use a means such as this which is perfectly rational. Dr. Hays said he knew he had done no harm in any of the cases, and in some instances the results have been remarkable, but it is possible that these results are not permanent. One patient that came to him had had this treatment at the hands of another physician some few months before, with no result, and yet after four weeks' treatment, during which time the patient was watched and measured carefully, the hearing had improved by the watch test from zero to four and one-half inches. Patients are not likely to come back for treatment every day for five or six weeks, and then repeat the treatment, unless they feel that it is doing them some good.

Not every one who tries this treatment will meet with success, and a certain amount of discredit will follow it, unless care is taken to try only suitable cases. The suggestion of paracusis is significant, and the paracutics respond the best. Moreover, the utmost care must be used in this treatment, for if too strong applications are made without varying the strengths of the applications, a complete destruction of the drum may take place. Moreover, making applications to a retracted drum which is bound down by adhesions, and in which there is no relaxation, is bound to result in severe destruction of the drum.

Report of a Case of Diphtheritic Infection of Both Ears Without Nasal or Throat Manifestations.

Dr. Wm. H. Haskin: The patient, a man fifty-one years of age, came to the Manhattan Eye, Ear and Throat Hospital with a violent inflammation in the ear, and from the appearance and history it was thought to be a case of geniculate ganglion neurosis. The membrane was punctured, and in a few days he returned with a very peculiar white exudate on the drum membrane. Then he had pain in the other ear and a temperature of 101°, but the pain in the right ear (the first one affected) had practically disappeared. A paracentesis was performed upon the left ear, and a culture was taken from the right ear, the membrane of which was covered with the peculiar exudate. The first microscopic examination showed what was thought to be a pseudodiphtheria bacillus, but on trying it out biologically it proved to be true diphtheria. By the time the true diagnosis was reached both ears were absolutely cured. No antitoxin was given to the patient, for it was not known that he had the diphtheria until he was well. There was nothing abnormal in the nose, and no indication of the condition, yet here was a true diphtheria of both ears, one following the other, with an absolute biologic diagnosis, and the patient recovered without any antitoxin.

DISCUSSION.

Dr. Duel said that he, too, had been invited to discuss Dr. Thompson's paper, and had been interested in hearing the experience of others on this subject. He himself had had four cases occurring in private practice within fifteen days, and with all possible diligence and caution had been unable to positively fix the source. He had attended the meeting of the New York Otological Society, feeling very blue about the matter, and found that a number of other men had had a similar experience, and as "misery loves company," he had been greatly relieved to learn that his own experienec had not been unique.

Dr. Perkins said that about three years ago, in Dr. Dench's clinic at the New York Eye and Ear Infirmary, there were four cases, occurring in mastoid wounds. There was a sort of gray pellicle covering the wound, not very thick. In three of the cases the true diphtheria bacillus was found. About that time one of the assistants contracted diphtheria of the nasopharynx from working on these cases. The ptaients were not given antitoxin, but cleared up under applications of alcohol and bichlorid. In these cases there were no symptoms indicating systemic infection.

Dr. Holbrook Curtis said that he had had a similar experience, and had come to the meeting hoping to learn something more of the subject. About two weeks before, a patient had come to his office complaining of a discharge from the right nostril. He examined her and washed out the right antrum, obtaining a half teaspoonful of pus and some bloody membrane in flecks, and scales agglutinated in a way that he had not seen before in antrum cases. He had it examined, sending a smear and culture tube to the pathologist, who reported that he was very much surprised at the quantity of Klebs-Loeffler bacilli found in the culture. Another smear was taken and sent to the Presbyterian Hospital, and the same report was returned. It was undoubtedly the Klebs-Loeffler bacillus. Four days ago the patient's right mastoid antrum began to pain, and this was followed in two days by perforation of the drum membrane. Examination of a culture from the ear showed the same result. The cultivations all showed that they were rather attenuated, requiring twenty-four to thirty-six hours to grow, but all contained the Klebs-Loeffler bacillus. The patient was given antitoxin (three thousand units) four days ago, and has improved since. Dr. Curtis said that he had been wondering whether or not to follow up the injections, and would like to have the opinion of some of the members who had had similar experiences.

Dr. Ard said that he had had one case of Klebs-Loeffler infection in the middle ear, followed by a double mastoiditis. In that case he had used antitoxin early, but without any appreciable effect. The process continued to operation. Recovery was uneventful, and in no way different from the usual cases. Eight or ten years ago he had had a series of cases (he thought five) within a very short time, where during the process of granulation and recovery after the mastoid operation there appeared a grayish membrane, quite thick, apparently infiltrating the granulation tissue. He was at a loss to account for it. The pathologist found a germ, but could not identify it. He had had no such experience before, and has had none since—possibly there was a Klebs-Loeffler infection which was not discovered. The treatment of these cases was similar to that mentioned by the other speaker, curetting, but the process of recovery was exceedingly slow, being prolonged for several weeks. One patient in a private room and separated by some distance from the other cases became infected and healing was prolonged.

Dr. Mulholland said that at the New York Foundling Hospital, on Dr. Kenefick's service, they had at the present time twelve cases of diphtheria of the middle and external ear, mostly unilateral. The patients are all children except one, and all show the Klebs-Loeffler bacillus. The average diphtheritic ear will clear up under treatment in two or three weeks, but some will persist for months.

Dr. Dougherty said that it was rather interesting to note how many cases of nasal diphtheria go unobserved. Some years ago he had had under his care in dispensary practice over a hundred cases of nasal diphtheria, which came for treatment merely complaining of a rhinitis or a slight epistaxis. Otherwise the patients were in an absolutely normal physical condition. They had no temperature, and were not in any way sick in appearance, only they had this nasal discharge. After wondering for a while at the prevalence of such cases, he began to take smears, and sent cultures to the Board of Health—something over a hundred of them—and in all cases there was a report of the presence of the true Klebs-Loeffler bacillus. Might not such cases as these, through continuity of tissue, explain some of the cases of middle ear conditions such as reported by Dr. Haskin and also Dr. Curtis' case?

Dr. Haskin, in closing the discussion, said he regretted very much that Dr. Thomson had not been able to attend the meeting and read his paper on Diphtheria and Pseudodiphtheria in Mastoid Cases, which he had been invited to discuss. He had intended in the remarks which he expected to make to call attention to some bacteriologic examinations of the ear which he and Dr. Dwyer had been making, and to ask the other men to give some attention to this subject and find out how prevalent this condition really is. He and Dr. Dwyer had had all the chronic cases in Dr. J. F. McKernon's clinic assigned to them for examination, and they had made smears and cultures which were carefully examined, and have treated the cases with autogenous vaccines. Looking over the cases which were capable of actual proof (there were twenty-eight cases in which the bacteria were isolated, and a number of mixed infections), there were seven cases in which the pseudodiphtheria bacillus was found. These had been thoroughly tested biologically, so there was no question of their being diphtheria. The condition is probably not uncommon, if carefully looked for.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of February 14, 1914.

Cases Illustrating the Use of the Cotton Albolene Pledget for the Improvement of Hearing After the Radical Mastoid Operation.

DR. WESLEY C. BOWERS said that some time ago he had tried the effect of a cotton albolene pledget in the radical cavity, and found that it improved the hearing considerably. He had directed Dr. Dench's attention to the matter, and Dr. Dench had asked him to show these cases before the Triological Society, and later Dr. Voislawsky had asked him to present them before the Section. Every one is familiar with the use of cotton albolene pledgets in residual cases of chronic purulent otitis media. This has precisely the same effect, though the pledget is much larger, and the patients can be taught to make and put them in themselves. This device works best in that type of cavity which has been previously skin grafted. The cases presented were both previously skin grafted. Of course, where the fundus is filled up with granulations and fibrous tissue, the hearing is so poor that naturally the pledgets will be of no use.

The method of application is exactly the same as used in the radical chronic purulent types, excepting that a large instead of a small pledegt is employed. Cotton is twisted upon the end of an applicator, flattened out into a mushroom-like top, removed from the applicator and cut off close to the top; the top is then dipped in albolene and by means of a pair of forceps it is inserted into the ear over the oval window.

Before the operation the girl heard at two inches on the right side; after the operation she heard at six inches, and with the pledget she heard at eighteen feet. The boy heard at four inches before operation; at six inches after operation; and with the pledget he heard at twenty feet. The best results were obtained with a private patient. This patient heard at two inches in the right ear, and with the pledget heard at over twenty-three feet.

As for how long the pledget should remain in, it is pretty hard to say. The boy has had the pledget in for a month, and his hearing remains the same; the girl changes hers every day; she claims that the pledget gets out of place. The pledget seems to have no deleterious effect on the cavity, and no ill effects have been noticed in any of the cases. A discharge was present for a year, in the case of the girl, in her left ear; there was excoriation over the inner wall, floor and facial ridge. With the use of the pledget, it has completely dermatized over, and the ear is now perfectly dry. In the right ear the tube is still open and the pledget has caused no trouble. She has been using the pledegt for six weeks.

Dr. Bowers said that he had used these pledgets in nine cases, and they worked well in eight of the nine. The ninth case heard so poorly that it was difficult to tell whether the patient heard at all with that ear or was depending entirely upon the other side. He could not be tested with the noise apparatus. There seems to be no question but that the hearing is benefited, and the device is well worth a trial. The great objection to the radical mastoid operation is the resulting injury to the hearing, and this pledget has been proved to be very helpful to these cases.

DISCUSSION.

Dr. Danziger asked how long after the operation these results were obtained. Usually, for a month or so after the operation, the hearing is poor, but improves when contraction has occurred.

Dr. Bowers replied that the right ear was dry and the pledget was tried seven months after operation. In the left ear it was introduced six months after operation.

Dr. Voislawsky said that every one was familiar with the use of pledgets in cases of chronic suppuration, but that he had never heard of using them after the radical operation.

Dr. Kerrison said that it was a most interesting suggestion, and asked that Dr. Bowers show how the pledgets were made, and the size employed.

Dr. Bowers demonstrated the making and application of the pledget. The patient can tell instantly as soon as the pledget strikes the right place.

Paper: The Diagnosis of Endocranial Complications.*

By Alfred Braun, M. D., and Isidore Friesner, M. D.

DISCUSSION.

Dr. Richards: Every one who has had clinical experience with suppuration of the labyrinth has been impressed with the fact that, so far as its complications are concerned, purulent meningitis ranks first, not only in frequency, but in importance. In cases of simple mastoiditis, meningitis does not arise as a relatively frequent intracranial complication. Speaking from my own experience, I should place, in the order of frequency, epidural abscess first; sinus thrombosis second; meningitis third; and brain abscess last. Of the intracranial complications of the suppurating labyrinth, however, meningitis stands preeminently first. The question naturally arises: Why this frequency, and to what particular relations is it due, and what are the factors influencing it? It is in this connection that I shall discuss certain clinical observations which may be of interest, particularly as they relate to the modiolus as an avenue of infection.

In one of the earlier cases of suppuration of the labyrinth which I operated upon, while removing the modiolus from the apex toward the base, to secure a complete exposure of the cochlea, I noticed a seepage of cerebrospinal fluid from the modiolus stump. The modiolus stump in this case was in no way fractured, yet the intracranial and operative cavities had been placed in direct communication. It was evident that the numerous canals traversing the modiolus from base to apex were not completely filled by the structures which they contained, and that the cerebrospinal fluid in consequence penetrated out into the modiolus—that is, grossly—to a greater or less distance. Nothing could better illustrate the intimate relation between the labyrinth and the intracranial cavities, and the ease with which an infective agent involving the fluid of the one may gain access to the other, producing a purulent affection of the entire cerebrospinal fluid column and the adjacent membranes. We also see that opening the labyrinth may, in a surgical sense, be the equivalent of opening the subdural space; and our attitude towards an infected labyrinth must be influenced by this simple clinical observation. It shows where a slow and gradual interchange between the fluids of the two cavities may occur.

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*See page 9, March, 1914, Annals.

A second point to which I wish to call attention is this: In those cases where we have either accidentally or intentionally removed the modiolus in its entirety, there is apt to occur a marked loss of cerebrospinal fluid. This outpouring may fill the operative cavity several times in a very brief interval. As the fluid gradually lessens, there comes a time when its escape ceases and the fluid merely fills the lumen of the meatus, maintaining an equilibrium. Now, if we chance to dress the case at such a time, we are enabled to observe the influence which respiration exerts upon the cerebrospinal fluid column, as indicated by the fluid's movement within the meatus, and we notice an ebb and flow, or a rise and fall, in the fluid. When we consider this effect which respiration has upon the cerebrospinal fluid column, in conjunction with the very intimate relation existing between the labyrinth and the intracranial cavities, as already mentioned, we see that this also may be an important factor in the spread of infection between the two; moreover, it indicates how the labyrinth fluid may be replenished and kept in a constant state of interchange.

A third reason suggests itself as to why in a suppurating labyrinth meningitis is a relatively more frequent complication than, for instance, epidural abscess. If one removes the calvarium and attempts to strip the dura from the floor of the skull, two areas will be found which are particularly resistant to the stripping. One of these is the petrous pyramid, the other is the floor of the anterior fossa of the skull around the cribriform plate of the ethmoid. In each locality the surface of the bone presents numerous irregularities for the close attachment of the dura. Now, it is seldom that we find clinically a collection of epidural pus at the floor of the anterior fossa arising from ethmoiditis, as compared to the frequency with which meningitis follows the affection of the nasal sinuses. It is also seldom that we find clinically a collection of epidural pus at the posterior petrous plane situated far in around the internal meatus, the reason being in each case the same, that is (aside from other factors which every one recognizes to exist), it is physically difficult for a collection of epidural pus to form in either locally where the dura is so intimately adherent to the adjacent bone. It presupposes that the pus shall collect under excessive tension, and with this factor of excessive tension given, it is notorious that infection tends to spread along whatever avenues it may, and not to confine itself; and so it is that meningitis is more apt to occur than an epidural collection of pus. While we recognize that collections of epidural pus at the outer portion of the posterior petrous plane are not uncommon, such collections in and about the internal auditory meatus are rare. I have observed it twice in about thirty labyrinth cases.

Another factor I should like to mention: When for any reason we injure the dura over the anterior cerebellar aspect, particularly in the region of the internal meatus, we are often confronted with a flow of cerebrospinal fluid which continues intermittently for weeks. Such an injury to the temporosphenoidal bone is accompanied by no such results. Why the difference?

When the dura of the temporosphenoidal lobe is injured, the brain mass protrudes as a bud of encephalon into the dural opening and shuts off the subdural space, and the subdural space remains shut off. This is not always the case in a corresponding injury to the cerebellar dura. Here we may see a protrusion of the encephalon into the opening temporarily, only to have it forced away later by the accumulation of cerebrospinal fluid in the cerebellar fossa, and this is the more liable to occur the nearer the injury to the internal meatus; for in the area referred to, the cerebellar fossa contains a relatively large qauntity of fluid which cushions the cerebellar mass more effectively from its internal dorsal surface than is the temporosphenoidal lobe cushioned from its opposing dural surface. It is easier, therefore, for an abscess stalk to form through inflammatory adhesion between the dura and the temporosphenoidal lobe than between the dura and the cerebellar lobe. This is a factor which has some bearing upon the relative infrequency of cerebellar as compared to temporosphenoidal abscess, and also upon the relative frequency with which meningitis primarily invades the posterior fossa; for in the latter, while the cushion of fluid protects the cerebellar mass, it itself, starting in direct relation to the internal meatus and the modiolus, which are great avenues of infection, consequently occupies a vulnerable position.

Dr. Richards said that he was very glad to have heard the paper, as it was a most practical presentation of the subject.

Dr. Kerrison said that the differential points given by Dr. Braun between suppurative labyrinthitis and cerebellar abscess were most important, since one who is not familiar with them might easily fall into serious error. As a matter of fact, however, there is not usually much difficulty in recognizing a cerebellar abscess secondary to labyrinthitis, i. e., providing that characteristic focal symptoms are present. The onset of a suppurative labyrinthitis and some cases of cerebellar abscess present certain points in common, in that in each condition nystagmus, vertigo and disturbance of static equilibrium are present. There are, however, certain differences which these phenomena present, as they result from one or other of these lesions, which easily distinguish them. For example, the nystagmus of acute suppurative labyrinthitis is constantly in one direction—i. e., in the direction of the sound ear—is increased when the eyes are voluntarily rotated in the direction of the quick eye movement, and is diminished when they are turned in the opposite direction. The direction of the patient's falling tendency bears a constant and invariable relation to the nystagmus and the position of the patient's head. In cerebellar abscess, on the other hand, the nystagmus changes its direction frequently, i. e., with movement of the head, changes in the position of the eyes, etc. Again, the direction of falling often shows no relation to the nystagmus. The nystagmus becomes rapidly and progressively less marked in labyrinthitis, and persists or increases in cerebellar abscess.

If we could imagine the simultaneous or coincident development of a cerebellar abscess and suppurative labyrinthitis, the interpretation of the combined symptoms might present great difficulties. It is difficult to believe, however, that a cerebellar abscess secondary to suppurative labyrinthitis could develop until long after the symptoms of vestibular irritation had completely disappeared; so that the two lesions, though presenting superficial similarities, should not be difficult to differentiate.

Dr. Kerrison said that the real problem with which we have to deal in suppurative labyrinthitis was that to which

Dr. Richards had devoted his remarks, viz., meningitis. Unlike cerebellar abscess, meningitis may develop at any stage of a labyrinthine infection. How are we to recognize the earliest phase of a meningeal infection occurring during the acute stage of a suppurative labyrinthitis? In other words, how are we to interpret definitely and correctly the meningeal lesion, before it has passed beyond the stage in which surgical treatment may be of value? That is the urgent problem which every practical otologist associates with suppurative labyrinthitis, and it is a problem which has not yet been solved.

In regard to the fistula test, to which passing allusion had been made, Dr. Kerrison said that he thought it should be recognized that this test may involve certain dangers of its own. Dr. Braun had mentioned the auditory and vestibular nerve tracts as among the pathways of infection to the meninges. Dr. Friesner had described the modiolus as having under the microscope the appearance of a sponge. If we imagine a defect (fistula) in the labyrinthine capsule, and the labyrinthine spaces as containing pus, it is surely a reasonable possibility that forcing air into the labyrinth may propel infective matter along pathways leading to important intracranial structures, with the subsequent development of serious intracranial infection.

Dr. George E. Davis said that, in the initial stages, a differential diagnosis is not always easy, between an acute suppurative labyrinthitis and a complicating meningitis; particularly if the labyrinth is infected during an attack of acute mastoiditis. In labyrinthitis, aside from the characteristic syndrome or triad—nystagmus, vertigo and ataxia—there may be severe headache, referred to the occiput or vertex, associated with nausea, vomiting and high fever. The latter symptoms, if continuing for more than a day or two, would cause apprehension of a complicating meningeal infection. However, as the labyrinthitis may be responsible for all these symptoms, and as the initial signs of meningitis are by no means uniform or pathognomonic, the element of time is an important role in the differentiation, and we are compelled to adopt the policy of watchful waiting for a brief period. Some authorities question the possibiilty of labyrinthitis, alone, producing severe headache, and attribute this phenomenon, when it is present, to the associated mastoiditis or meningitis. However, I believe that labyrinthitis, alone, may be responsible for this symptom, and in this opinion I am supported by such authorities as Kerrison and other writers.

Dr. Friesner expressed hmself as being much gratified with the discussion evoked by the paper. There is no question but that meningitis is by far the most frequent complication of labyrinthitis. This fact has been observed, clinically, only since functional tests of the labyrinth have been made regularly, but it was observed pathologically long before that. In the days when he was a medical student, he frequently heard urged as a deterrent for the performance of the radical mastoid operation, the frequency with which it was followed by meningitis, with no apparent reason. These cases were intracranial extensions from chronic latent suppurative labyrinthitis. The labyrinthine disease was not recognized.

Histologic examinations support Dr. Richards' statement with regard to the broad lymph channels of communication between the labyrinthine spaces and the subdural spaces. The modiolus in the human temporal bone looks like a sponge. It is full of holes, and unquestionably these holes are lymph spaces, so that a series of very broad avenues of communication exist, between the labyrinthine spaces and the subdural spaces, through the internal auditory canal. Then there is a direct avenue of communication, which is second in importance as a pathway of infection, and that is the aqueduct of cochlea.

Dr. Friesner said that he had not before thought of the effect that respiration must have in sucking infection, as it were, from the labyrinth, through the lymph spaces, into the meninges. Undoubtedly the most important reason why meningitis occurs so frequently is that there is no opportunity for the process to become walled off. Peculiar pathologic conditions within the labyrinth also seem to prove this. It is a very common thing to have a tuberculous invasion of the labyrinth, and yet tuberculous middle ear disease rarely leads to meningitis, through the labyrinth.

With regard to the fact that the dura is particularly adherent to the posterior petrosal wall, anyone who has done much work in the dead-house can readily subscribe to that observation. The posterior petrosal wall is full of pits and of irregularities, and the dura has a way of being tucked into these pits, so that it is difficult to strip it off without tearing it. It does not seem certain, however, that this favors a meningitis. Where the dura is readily stripped, it seems that the avenues of communication, so far as the lymph channels are concerned, are very much more numerous. We know how the dura is stripped from the cranial bones of children, and that, in such dura, the lymph channels are richer than in adults. Dr. Friesner said that he has a specimen which shows an extension of a suppurative labyrinthitis through the dura, covering the posterior petrosal wall. He also has the cerebellum of this case, which shows an abscess cavity which is in contact with the posterior petrosal wall. In this instance it would seem that the fact that the dura was so adherent, favored a slow perforation and the formation of a cerebellar abscess, rather than a diffuse meningitis.

Neumann, in his book on cerebellar abscess, states that it is associated with labyrinthitis in sixty per cent of the cases. Dr. Friesner said that he had been intending to look over the statistics, since the time functional tests were regularly made, in all chronic suppurative cases that had come to operation. It was his impression that cerebellar abscess is associated with a greater percentage of dead labyrinths than sixty per cent.

Dr. Kerrison seemed to think that the differential diagnosis between cerebellar abscess and acute suppurative labyrinthitis presented few difficulties. Dr. Friesner said that he could not agree with Dr. Kerrison on this point. It does present difficulties. Of course, a typical case of manifest labyrinthitis cannot be confused with a cerebellar abscess; but given a dead labyrinth, it is difficult at times to determine whether it exists alone, or is associated with cerebellar abscess. Sometimes these patients are brought to the hospital comatose, and no history can be obtained. In the Transactions of the German Otological Association of 1911, Dr. Bárány describes such a case.

Dr. Friesner said that he did not believe, with the knowledge that a cerebellar abscess occurs so frequently in the presence of a dead labyrinth, that the differential diagnosis between a labyrinthitis alone and one complicated with a cerebellar abscess was an easy task.

We know that functional tests of the static labyrinth arouse stimuli of various strength, the weakest being the caloric test. That is destroyed almost as soon as the hearing. Hearing is the most easily destroyed labyrinthine function. Where there is a diffuse labyrinthitis, secondary to a circumscribed labyrinthitis, the fistula test is the last to disappear. He had previously heard of the danger of the fistula test. If the fistula test is considered mechanically for a moment, one must believe that the portion of the endolabyrinthine wall which is most affected by disease is that in the fistula. As a matter of fact, as soon as compression is made, that wall collapses—possibly there is less pressure made there than on any other portion.

Another reason for the belief that there is little danger in the fistula test is that, although he has read the literature of labyrinthitis carefully for years, he had found no mention made of such danger in any of the cases reported. He could not recall ever having heard of a case of diffuse labyrinthitis following that test. While no one would use it unnecessarily, there does not seem to be any considerable danger attending it.

Referring to Dr. Davis' remarks, Dr. Friesner said that there is very frequently pain with labyrinthitis—not because of the labyrinthitis, but because an acute diffuse labyrinthitis is so often associated with an exacerbation of a chronic middle ear suppuration and an acute mastoiditis. The patients can have some headache from the persistent vomiting caused by the labyrinthitis, but they do not have the severe headache of meningitis. Moreover, it has been shown that all forms of labyrinthitis may exist without a rise of temperature. A labyrinthitis, even a diffuse suppurative labyrinthitis, does not cause a high temperature, and whenever there is a temperature of 102° or more, with headache, the chances are that we are dealing with a meningitis.

Dr. Braun said that as ordinarily made, with the Politzer bag in the external auditory canal, he had never seen any harm follow the use of the fistula test; but in two cases, in which a radical mastoid operation was done, where the fistula test was demonstrated by touching the fistulous area in the horizontal semicircular canal repeatedly with gauze or a probe, he saw a diffuse serous labyrinthitis follow.

NEW YORK OTOLOGICAL SOCIETY.

Stated Meeting, November 25, 1913.

DR. ROBERT LEWIS, PRESIDENT, IN THE CHAIR.

Ridge Forceps With Cutting Edge Turned in Opposite Direction.

DR. STEPHEN H. LUTZ, of Brooklyn, presented an instrument which was like his ridge forceps, only turned the opposite way from the usual. He had found it difficult in a number of cases to get far enough upward and forward with any other instrument, and decided it would be feasible to simply turn the cutting edge of the ridge forceps in the opposite direction. He had this done, and found that it worked very well.

Punch of a New Pattern.

DR. LUTZ also showed a sphenoid punch of a new pattern. This is similar to the Faraci punch for removing the anterior wall of the attic. The instrument is strong though small, and can be introduced into any small opening.

DISCUSSION.

DR. ARTHUR B. DUEL had long felt the need of a punch by means of which one might cut from behind forward in work on the nasal septum, and if Dr. Lutz had devised such an instrument he had filled a patent need.

Adenoid Removed From a Child Three and One-half Years Old.

DR. ROBERT LEWIS presented a specimen of an adenoid measuring three and one-half inches in length by one-quarter of an inch in thickness by three-quarters of an inch in width. It was removed from a child three and a half years of age, a rosy-cheeked little one, who had no difficulty in breathing through his nose. It was removed with a Gottstein curette. The tonsils were enlarged, but not unusually so.

Two Cases of Mastoiditis in Which the Streptococcus Capsulatus Mucosus Was Found.

DR. EMIL GRUENING detailed two cases of mastoiditis in which the streptococcus capsulatus mucosus was found.

The first case, a woman forty-five years of age, from another state, became ill at the hotel. He had seen her ten years before, at which time she had chronic aural catarrh, but no inflammatory process. On the present occasion she had been ill for two days when he was called to see her. He found the mastoid of one side tender, very little discharge from the ear, and a temperature of 101.4° F. The drum was incised and the streptococcus capsulatus mucosus found. Inasmuch as the mastoids were very large, as there was only slight tenderness on one side, and as there was a very slight degree of elevation of temperature, X-ray pictures were taken of both mastoids. Large pneumatic cells were found on each side. On one side all were clear; on the other they were dark. All the cells of one side at the apex were filled with pus, as were likewise those over the sinus and in the zygomatic process. All this was read from the X-ray plate. The patient was operated upon on the 7th of October, the fifth day after the onset of the disease. The exact conditions represented by the X-ray were found. The septa separating the cells were already broken up. The entire field was cleared out completely, and no recurrence had taken place.

In the second case he was called in on Friday. The mastoid was exceedingly tender, and there was a slight elevation of temperature—101.5° F. The patient, a German, felt very weak, and was sent to the New York Eye and Ear Infirmary for operation. Upon opening the mastoid on the affected side the streptococcus capsulatus mucosus was found. Every small cell of the mastoid was cleared out completely, even cells under the facial ridge. It was a complete operation. The patient recovered, and three weeks after the operation there was no pain and no temperature.

By immediate and thorough operation as good results could be obtained in mastoiditis due to streptococcus capsulatus mucosus infection as in any other variety. German otologists were devoting considerable attention to this class of cases.

DISCUSSION.

Dr. William H. Haskin mentioned, in this connection, a paper read before the Section on Medicine of the Academy of Medicine in November, 1913. In this paper, Rosenau reported the results of his researches and showed pretty conclusively that the streptococcus pyogenes, the pneumococcus, the streptococcus mucosus capsulatus, and all the various streptococcus varieties, such as that associated with rheumatism, and the streptococcus viridans, the streptococcus found so often in endocarditis, were one and all transmutable the one into the other—thus by growing a pneumococcus on special media and under special conditions, he could change it into the streptococcus, and vice versa. The thing for us to remember, as clinicians, is the fact that it is the possession of a capsule that adds so much to the virulency of an organism—that the capsule confers great power of resistance to the organism possessing it, and it is in all probability to the possession of a very thick capsule that we must attribute the great virulency of the streptococcus mucosus capsulatus. This organism morphologically resembles the streptococcus in that it appears in chain formation, but the points of similarity end there, as the organism biologically is more like the pneumococcus in its possession of a capsule and in its serum reactions. We must, therefore, be careful not to single out the mucosus capsulatus by itself, but be especially careful where we have to deal with any organism possessing a resistant capsule, bearing in mind that this capsule protects the organism from the phagocytic and other defenses of the body, and therefore is all the more to be feared.

Dr. Robert Lewis said this point had been brought out in a discussion at a recent meeting of the Hospital Graduates' Club, when Dr. Dixon said that in cases where the streptococcus capsulatus mucosus was found the area of necrosis was much more extensive after a short interval of invasion than in cases where other forms of streptococci were present, and the physical signs of a mastoiditis were, as a rule, absent or not well marked.

Dr. E. B. Dench recalled having reported, six or seven years ago, a series of thirteen cases of streptococcus capsulatus mucosus infection of the middle ear. All were treated by means of free drainage, only two of the cases coming to operation.

If streptococcus mucosus infection were drained early and thoroughly, the results would be no different from those obtained in any other variety. He recalled a case in which the drum membrane was incised on the fifth day after the inception of the symptoms. There was then a little mastoid tenderness. The symptoms cleared up completely. The patient was a man over sixty years of age, whose other ear was practically useless in consequence of a previous infection. In every case which cleared up under incision of the drum membrane the patient remained well. He agreed with Dr. Gruening and Dr. Dixon that extreme care should be exercised in these cases, but he did not believe that in the presence of this organism one should proceed at once to operate. With reference to X-ray plates, he said that for three or four years Dr. Dixon, in numbers of cases, had pointed out localized infections which had been demonstrated upon operation.

Dr. Stephen H. Lutz cited two cases in young children in which streptococcus capsulatus mucosus infection was entirely checked by simple drainage. In one case in which he had operated upon the mastoid of the opposite side two years before, the child's father, a physician, did not want a second operation, so the ear was drained. Results had been less satisfactory in several other cases, because the patients were not seen until several days after the onset of the disease. He emphasized the importance of instituting treatment early.

Dr. Haskin referred to a series of eight cases from the clinic of Dr. McKernon, treated by means of autogenous vaccines. Three of these were streptococcus infection, and for personal reasons the patients refused operation. After treatment without vaccines for from four to eight weeks, with no success in checking the discharge from the ear, autogenous vaccines made by Dr. Dwyer were employed. In the one case there was a perforation through the posterior canal wall, the ear was discharging profusely, and there was intense pain. In the three cases the streptococcus infection cleared up with the use of the vaccines, with no return whatever. Several cases of staphylococcus infection, and one of bacillus proteus vulgaris, cleared up under the use of autogenous vaccines. He had tried the vaccines four or five years ago, but owing to poor technic there was such a mixture of bacteria in the canal of the ear no vaccine could be made. Last winter he tried the plan of making the canal perfectly sterile with alcohol before getting the smear, then using the otoscope, drawing the secretion down from the deeper recesses of the ear, and making the vaccine from this. He emphasized the necessity for isolating the bacterium which causes trouble in a given case, and making a vaccine from this.

Dr. Arthur B. Duel thought the discussion was wandering from the important point in the cases cited. Dr. Gruening had emphasized the importance of the radiograph as a means of indicating the necessity of early operation in certain cases of streptococcus mucosus infection. An X-ray picture should be taken in every such case, and if, as in Dr. Gruening's cases, a mass of pus was found, operative interference should be instituted at once, regardless of the clinical findings.

Dr. Wendell C. Phillips cited the case of a strong and otherwise healthy woman who gave a history of a very sudden onset, with pain so severe that she went to his office at four o'clock in the morning. She was sent to the hospital for operation. The report from the blood culture was streptococcus capsulatus mucosus. The temperature was 103° F., and there was mastoid tenderness. Operation was deferred, and after two days the symptoms cleared up perfectly. He did not advocate, as a usual thing, this plan of procedure, but in this case the symptoms cleared up without operation.

Dr. Gruening, in closing the discussion, said the mastoid is not usually very tender in streptococcus capsulatus mucosus infection. The tendency is not for this to perforate the drum membrane, but to extend toward the brain. In the papers by Siebenmann and others, it has been found that there is a tendency to mastoid involvement, with very rapid destruction. All these authors agree that the organism under consideration is the most dangerous of the streptococci. He maintained that whether these germs are or are not identical as to culture, they are certainly different clinically. In some cases, if operation had been performed on the sixth day, the patient would have died. In the case which Dr. Whiting reported there was a similar process. The streptococcus capsulatus mucosus has quite a different action upon the bone. The drum membrane may heal and the process become latent. In the German literature there was a consensus of opinion in regard to the streptococcus mucosus. The two cases reported bore out the German view. In both his cases there was spontaneous perforation; one should not wait for this, however, but should make the perforation and make it large.

Case of Right Temporosphenoidal Abscess.

Dr. Arthur B. Duel reported a case of right temporosphenoidal abscess in a female patient who appeared at his clinic at the Manhattan Eye and Ear Hospital nine months ago. She was sent immediately to the operating room with a diagnosis of mastoiditis and large subtemporal abscess. The abscess was found upon operation to contain about an ounce of pus; the mastoid was necrotic and filled with pus and granulations. After cleaning it out a fine line of pus was discovered extending from the dehiscence in the inner plate in the temporosphenoidal region. On removal of the inner plate over mastoid antrum and attic a "stalk" was discovered leading to an abscess in the temporosphenoidal lobe. A few layers of rubber tissue were passed through this into the abscess, great care being used to avoid injury of surrounding healthy tissues. Recovery was uneventful.

DISCUSSION.

Dr. Gruening said the patient, as a rule, does not complain of blindness, the vision generally remaining good. He asked if the cases recovered.

Dr. T. Passmore Berens recalled a case of brain abscess in an epileptiform subject. The patient came to his clinic at the New York Polyclinic Medical School and Hospital several years ago, and was suffering from a profuse discharge from the ear, which he claimed to have had since childhood. Dr. Berens performed the Schwartze-Stacke operation, and in doing so exposed a small fistula which was discharging pus through the dura into the region of the tegmen. Operation laid bare a large abscess in the temporosphenoidal lobe. Recovery from operation was very rapid, and the patient was free from epilepsy for a number of months. At no time were there any eye symptoms.

Thrombosis of the Lateral Sinus Cured Without Operation.

Dr. James F. McKernon reported thrombosis of the lateral sinus cured without operation in two cases. One case, first seen on April 16th, at about four o'clock in the afternoon, gave a history of discharge from the right ear for nine weeks. Upon examination pus was found in the external auditory canal; the lumen of the canal was obstructed by a general infiltration, extending to the meatus. The patient was taken to the hospital and operated upon that night. It proved to be one of the most extensive mastoids he had ever seen, extending almost back to the occipital articulation. The inner table was found necrotic over the roof of the antrum and floor of the middle fossa, and the sinus was uncovered for more than an inch posterior to the knee, to a point entering the bulb below. At this time the blood current seemed to be normal. The boy was placed in bed, with a temperature ranging from 100 to 102° F. The left ear had also been discharging for three weeks. On the fifth day the temperature rose to 104.5° F. Examination of the left ear showed the drainage obstructed, with marked prolapse of the drum membrane over the whole area. The left mastoid was operated upon that afternoon. The patient did indifferently for about five days, with a temperature ranging from 98.5 to 102° F. Suddenly he had a chill, with propulsive vomiting. The temperature rose to 106.4° F., rectal temperature in the afternoon being 105.4°. Believing the sinus to be involved, he advised immediate operation, but this the father positively refused to allow. He saw the father at the hospital at eight o'clock the next morning. Operation was still refused. The father was told that if he would assume all responsibility the child would be kept under observation and treated without operation. A blood culture was taken; one hundred and five colonies to the slide of streptococci were present. The child had another chill, and the temperature, which had dropped to 102 degrees, rose again to 106.6° F. The father again refused operation. Another blood culture was made. This showed ninety-four colonies to the slide. Streptococci viridens were then isolated, and a serum made therefrom. This required twenty-four hours. In the meantime the child had two rises of temperature, the first to 104.2, the second to 106.4° F. The usual dose of the serum was 100 millions, but in this case an injection of 150 millions was made. This seemed to have no effect. The temperature rose again in the evening, there was nausea and vomiting. The first dose was given at two o'clock in the afternoon, and at ten that night 500 millions more were given. After this the child improved, making a steady recovery. Judging from the physical signs, the sinus was unquestionably plugged with a clot. The number of injections given was six, the dosage being 500 millions daily after the first twenty-four hours.

In another case, a boy, there was streptococcus capsulatus mucosus infection three days after mastoid operation. The bone involvement was not so extensive as in the first case, nor was the vomiting so pronounced. Blood culture gave eighty colonies to the slide of the streptococcus capsulatus mucosus. The bacteriologist advised a mixed vaccine in this case. Six injections were used, one each day, and the child made a perfect recovery. The sinus was not opened, but there was sufficient clinical evidence to warrant the diagnosis of sinus involvement.

DISCUSSION.

DR. WENDELL C. PHILLIPS said the statements made by Dr. McKernon bore out his own findings in the dead-house and in clinical experience, to the effect that spontaneous recovery in these cases takes place. He expressed himself as being not very enthusiastic about the vaccine treatment. He would have to see a large number of cases before he would be convinced that any of the cases reported would not have recovered without the vaccines.

.DR. MCKERNON, in closing the discussion, said he did not wish to be misunderstood with reference to the cases cited. He believed in the usual procedure of evacuating the sinus contents, but in some cases in which operation could not be performed, on account of the condition of the patient, or because operation is refused, it was necessary to resort to other measures. He agreed with Dr. Dench with reference to reporting cases in which vaccines are employed. He also recognized the fact that in some cases of lateral sinus thrombosis spontaneous cure may take place. He did not advocate the use of vaccine except in cases in which operation is contraindicated or refused.

Mastoiditis of the Streptococcus Capsulatus Mucosus Variety Treated With Hiss Leucocyte Extract.

DR. WILLIAM H. HASKIN reported a case of mastoiditis, of the streptococcus mucosus variety, treated with Hiss leucocyte extract. There was mastoid tenderness at first, but this soon subsided. The temperature ran around 105° F. for five days, and a positive bacteremia was found, when it was discovered that the patient, a child, had acute endocarditis. An infarct then developed in the right groin. Dr. Phillips and Dr. Rae both saw the patient, and agreed that on account of the desperate condition of the child, who was in a state of true sepsis, operation was not advisable. Colonies of streptococcus capsulatus mucosus were no numerous in the blood cultures that it was almost impossible to count them. The child was given 10 cc. every day of Hiss leucocyte extract. Five days after the first blood culture another was taken, and this proved absolutely negative. The symptoms improved, and a week later another culture was made in order to be sure that there was no bacteremia. A week later still another culture was made. The patient now laid in the typical position of hip joint disease. Dr. Berg, of Mt. Sinai Hospital, who was now called in, thought there was an infarct in the hip joint. X-ray gave no evidence of pus. The child was kept in the hospital for a month. He was then sent to the New York Hospital and the swelling in the right groin operated upon. A walled-off abscess was found, with about two ounces of pus. When he saw the patient at the Manhattan Eye and Ear Hospital about two weeks ago, seven months after treatment, he was wearing a brace. He was otherwise perfectly well. The only treatment was the administration of the Hiss leucocyte extract, and its effect was truly remarkable.

DISCUSSION.

DR. ARTHUR B. DUEL called attention to the very different remedies for the same condition. Dr. McKernon gave an autogenous vaccine in one case and a stock vaccine in another, and both recovered. If recovery was the result of the action of the vaccine in these cases, it must be attributed to the stimulation of production of antibodies within the system; in other words, within the patient's own laboratory. Dr. Haskin's cases, on the other hand, if they were cured by Hiss serum, were cured by the introduction into the system of a substance manufactured in an outside laboratory, which in itself was an antidote to the poison apparently overwhelming the patient. There was no analogy between the cases other than that they both illustrated an important fact, viz., that all hope need not be abandoned when cases were doing badly.

even after the best effort had been made to localize or eliminate the source of infection, or in rare instances where no such effort had been made for some good reason. Stimulation of the flagging energies of the patient's own laboratories, on the one hand. or introduction of aids from outside laboratories, on the other hand, might prove efficacious.

Dr. Edward B. Dench agreed with Dr. Phillips that a certain proprotion of these cases recovered spontaneously. He thought cases treated with vaccines should not be published until the method had been thoroughly tested. The general run of practitioners take too kindly to the vaccine treatment as a substitute for operative interference, and for this reason he thought it ill advised for such reports to get into the literature. The report of such cases in camera, however, was quite permissible, as looking to a solution of the question of the value of the vaccine treatment.

Dr. Robert Lewis recalled a case seen by him fifteen years ago, in which there was no bacteriologic examination. He performed a double mastoid operation, which was followed by a sudden rise of temperature, with a chill. Dr. Whiting and others were called in consultation, and the diagnosis of lateral sinus thrombosis was made. For thirteen days the child had a temperature ranging from 96 to 106° F. Nothing was done except to keep the mastoid wound clean. Perfect recovery resulted.

Dr. William C. Braislin said he had in his possession a specimen of an obliterated sigmoid sinus which had not been operated upon, but which had healed spontaneously years before the patient came under his observation for mastoiditis and sinus disease of the opposite side.

At autopsy, this obliterated sinus was found on the side which presented no symptoms during the time the patient was under the observation of the reporter.

Dr. J. E. Sheppard, of Brooklyn, apropos of the readiness of the profession to use the vaccines, cited the case of a man who consulted him, two weeks previously, for chronic middle ear suppuration. During the three weeks previous to this he had had five injections of vaccine, which had been attended by constantly increasing headache and mastoid tenderness. The physician who gave the vaccines told the patient he would be all right if he would continue a while longer. Within two hours after the speaker was consulted the patient was operated. The condition was so far advanced that he did not dare to do more than the Schwartze part of the radical operation. A few days later he proceeded to complete the radical mastoid operation. This was followed by complete recovery.

Fracture of the Bony Meatus.

Dr. Philip D. Kerrison reported a case recently seen by him at the Polyclinic Hospital, in which the patient, a woman, fainted while going to the bathroom at night, striking her head, and losing consciousness for some time. There was very copious bleeding from the left ear, on which account he was called in to determine whether she had sustained a fracture of the base of the skull. The chin was evidently the part which struck when the woman fell. Examination revealed a perfectly intact but inflamed drum membrane, and tests proved the hearing to be perfect. There was a linear laceration along the floor of the bony canal. It was perfectly apparent that she had had a fracture through the bony meatus, and that it did not affect the petrous bone. The force was transmitted through the inferior maxilla to the temporal bone.

DISCUSSION.

Dr. J. E. Sheppard was reminded of the case, seen by him about three years ago, of a young man, twenty-three or twenty-four years old, who had fallen through an elevator shaft, with resulting marked deafness. The tympanic cavity on each side was filled with blood, but there was no rupture of the membrane. It was decided, after some deliberation, not to incise the drum membrane for fear of introducing infection. One ear recovered completely, the other partially. The point especially emphasized was that the drum membrane was not incised because of the danger of introducing infection.

Dr. Edward B. Dench recalled a case in which he opened the drum membrane and evacuated the blood, with resultant perfect recovery. There was facial paralysis Dr. Dench thought there might have been a dehiscence in the facial canal.

Dr. John R. Page reported a case in which a man was injured in getting off a car. Examination proved that the right tympanum was filled with blood. There was some deliberation as to whether or not it was advisable to incise the drum membrane, because of the possibility of thereby infecting the labyrinth and meninges in case there had been a fracture through that part of the bone. There was considerable disturbance of equilibrium, and nystagmus, but as fairly good hearing was present, the supposition was that there was no fracture through the bony labyrinth, so the drum membrane was incised and the tympanum evacuated, with marked improvement in hearing and relief of tinnitus.

Chronic Purulent Otitis Media With Cholesteatoma.

Dr. Wendell C. Phillips reported a case which emphasized a point brought out by Dr. Rae—the significance of one-sided headache in cases of chronic purulent otitis media. The patient, a man fifty-six years old, had had otitis media since childhood. Some weeks before he first saw the patient he had had a very severe attack of vertigo and vomiting, with a temporary elevation of temperature. This condition lasted several days. There was loss of hearing on the affected side. There was gradual recovery from the vertigo, but the patient complained of very severe headache on the affected side. When he first saw the man there was a very faint discharge from the ear, but the retained inspissated masses led him to suspect the presence of cholesteatoma. Tests showed an absolutely dead labyrinth, there being no response to the fistula or any of the usual tests. Radical mastoid operation was advised because of the suspected presence of cholesteatoma and of destruction of the labyrinth, and performed. In all his experience he had never seen such a large cholesteatoma. The entire space of bone, extending over the knee of the sinus, which was exposed, and including the entire tegmen over the mastoid antrum and attic, was destroyed. The dura over the middle of the cerebral fossa was uncovered. In doing the radical mastoid operation he found a distinct fistula. In clearing out the granulation tissue from the middle ear he found all the ossicles, even the stapes, gone. The labyrinth was opened and cleared out thoroughly. The posterior wound was not closed, because of the very extensive nature of the disease, and in order to be able to watch it for some days. The facial nerve was distinctly seen at the time. After twelve hours slight paralysis of the facial nerve developed. There was a profuse discharge of pus for the first few days, but subsequently there was improvement in every particular except with reference to the intense headache. The patient was a very nervous man, and on several occasions he was given placeboes, after which he would go to sleep and sleep all night. After a week or ten days the postauricular wound was closed, and the patient was able to sit up and to walk around. He was never free, however, from the headache. After leaving the hospital he reported at the speaker's office every other day, until early in November. The headaches grew worse. He had a slight rise of temperature, but no paralysis; none of the signs which one would expect, not even the slow pulse. The pulse ranged around 75 and 80. His symptoms then grew worse, he was sent to the hospital, and lumbar puncture was made. The cerebrospinal fluid was cloudy, and there was evidence of sepsis. Between four o'clock in the afternoon and eight in the evening he had become unconscious. With no symptom to be guided by other than the persistent parietal pain, it was decided to search the middle cerebral fossa. Soon an encapsulated abscess was found, with a large amount of pus. On account of the very rapid manner in which the meninges were invaded, this abscess must have ruptured into the ventricle. The persistent hemicrania was relieved for a time by operation, but the patient finally succumbed to meningitis.

NEW YORK OTOLOGICAL SOCIETY.

Stated Meeting, January 27, 1914.

DR. F. WHITING, PRESIDENT, IN THE CHAIR.

Radiographic Plate Showing an Alveolar Abscess, With a Small Fragment of a Tooth in Situ.

DR. T. PASSMORE BERENS presented a radiographic plate showing an alveolar abscess, with a small fragment of a tooth in situ. The patient, a woman fifty-eight years of age, had had all the teeth of the upper jaw extracted six or seven years ago. Following this there was swelling in the canine fossa of one side, which would become larger and then smaller, until last November, when it was opened by the family physician and a large quantity of pus was found. He referred the patient to the speaker, who, upon operation, discovered the fragment of tooth in the bottom of the large cavity, with inflammation around it, and a cyst fully three-fourths of an inch in diameter, which was filled with pus. The upper border of this cyst was connected with the antrum of that side.

DISCUSSION.

DR. THOMAS J. HARRIS said he was called in to see this patient while Dr. Berens was operating. The unusual feature about the case was the large size of the cavity and its connection with the antrum.

DR. WILLIAM H. HASKIN recalled having reported, in 1908, three cases similar to the one cited by Dr. Berens. Since that time he had had seven or eight more. It was not an uncommon occurrence to find these remaining roots. It was likewise not uncommon to find teeth which have never erupted. He had had a case, a patient over sixty-two years of age, in which there was a history very similar to that of Dr. Berens' case. Extraction of the teeth had not relieved the pain, and on account of acute inflammation in the jaw the patient was sent to him. An unerupted upper lateral incisor was found and removed. In each of three other cases, upon operating he encountered fully formed teeth. In one case there was a tooth which could not force itself down, and the root had developed upward, extending along the floor of the nose. The tooth was the shape of a comma. In another case there was a large dentigerous cyst. This was opened and swabbed with nitrate of silver solution, and the following day a hard blackened mass was detected with a probe. It proved to be an odontoma on an unextracted root, and was probably the cause of the original pain. The man had had all his teeth extracted, without relief of pain.

Dr. Stephen H. Lutz cited a case in which a completely carious tooth had turned around and the crown had erupted into the antrum.

Fistula at the Apex of the Semicircular Canal.

Dr. T. Passmore Berens mentioned a case of fistula at the apex of the semicircular canal in a man fifty-five years of age, with a history of long standing suppuration. The patient was now convalescing after a Schwartze-Stacke operation, and the symptoms had almost entirely disappeared.

Venous Anomaly in Mastoid Operation.

Dr. Wendell C. Phillips related an experience which he had had the day before with a colored female patient whose history was rather indefinite before the operation. She had had chronic suppuration for many years. A simple mastoid operation had been performed, and last summer she had had a radical operation. When the woman appeared at his service at the Postgraduate Hospital she had an unhealed radical mastoid wound. There was considerable inflammation in the postauricular region. He attempted to clear out by making a large wound and a large flap. As he began to curette the granulations from the attic, he found an unusual amount of hemorrhage. Just at this moment one of the house staff said he had operated upon this patient last summer, at which time there was very profuse hemorrhage. The pathologist had reported angioma. Proceeding with the present operation, further erosion of the bone, causing exposure of the dura, was found, and a mass was encountered between the oval and round window posteriorly and the prominence anteriorly. As the granulations were cleared away he came down upon a large vessel which, from the color, was thought to be a vein. It was about the size of the external jugular, and was of sufficient size to cause him not to open it. He could not determine what it was. Whether it was an auxiliary petrosal, he could not say. It was evidently not the bulb, but it was connected with the lateral sinus in some way. He purposely made a very large incision in the concha; if, therefore, he is successful in closing the posterior wound, he will probably have an opportunity to study the case further.

Abnormality of the Bulb, or Malignancy.

Dr. Thomas J. Harris referred, in this connection, to a case reported before the Society last spring, in which he had operated, suspecting a protrusion of the bulb into the external auditory canal. The patient, a young man, had been under his observation for a week. He had been complaining of pain, the source of which the speaker endeavored to discover. In carrying the probe in he touched a protruding mass. After touching it again there was very profuse hemorrhage. The pain increased and the mastoid was explored. Nothing was found in the mastoid but this mass protruding out into the floor. The hemorrhage was so severe that it was impossible to go further. He concluded that the protrusion was the bulb. The immediate results of the operation were favorable. The small mass which was removed at the time was sent to the pathologist, who reported malignancy. The clinical diagnosis wavered between malignancy and abnormality of the bulb. He favored at first malignancy. There had been, however, no return of the growth and no return of the pain. It did not look now like malignancy, yet the bleeding was certainly more than usual with granulations. There must have been chronic suppuration in childhood, but there was no obtainable history of this. He was now of the opinion that the condition was not one of malignancy, but of abnormality of the bulb. A radiograph was taken, but it had no bearing upon the diagnosis or the clinical course. The radiographer insisted that there was trouble in the mastoid antrum, but there was none.

DISCUSSION.

Dr. Haskin thought it not at all uncommon to find the jugular bulb in direct contact with the floor of the labyrinth. He has, perhaps, as many as twenty bones which show this. He believed this to be the condition in Dr. Harris' case, which he saw at the time of operation.

Dr. Gruening said in the specimen presented, the bulb covered the fenestra rotunda. If the incision had been made downward instead of upward, the bulb would have been cut.

Discoloration of Drum Membrane.

Dr. J. E. Sheppard reported a case in which there was a very dark discoloration of the drum membrane. The patient, a young man, consulted him, not about this ear, but about suppuration of the opposite ear, on which side the mastoid had been operated in 1902. The drum membrane was apparently bulging into the external auditory canal, and was of a dark bluish purple color. The landmarks were practically obscured, with the exception of what he thought was a faint outline of the malleus handle. He would be afraid to cut into it. The hearing for the watch this morning was fourteen inches, normal six feet. The hearing in November was as good as it is now. In looking over the history, taken in 1902, when he operated upon the patient, he found he had made the note that "this membrane appears cicatricial." He had made no note then of any discoloration, which he certainly would have done if it had been present.

Dr. Phillips called attention to the frequent occurrence of dehiscence in the floor of the bony canal. In this case, however, there was no dehiscence. It had been stated by one who examined Dr. Sheppard's case that these anomalies are more frequent in the colored race.

Hemorrhage in a Hemophiliac Male Child Two Years Old.

Dr. Sheppard recalled having reported to the Society last spring a case of hemorrhage in a hemophiliac male child, two years old, resulting from incision of the drum membrane. He had subsequently to do a mastoid operation, which was followed by persistent bleeding. The child was given repeated large amounts of human blood serum, with resultant cure. Last week a child eight months old, sex unknown, was brought in to him bleeding from both ears. He did not know whether the membranes had been incised, or whether the bleeding was spontaneous. At any rate, the family physician had been trying to stop the hemorrhage by using horse serum in 5 cc. doses. The horse serum appears more dangerous and less effective than human serum. The skin had been abraded around and behind the concha and on the drum membrane. Wherever there was abrasion there was hemorrhage. He had immediately given 20 cc. of human serum, followed by cessation of hemorrhage after two or three hours. There was no history of hemophilia in the family.

DISCUSSION.

Dr. Harris was reminded of a case, of a baby a few days old, which came under his observation two or three years ago. At the urgent request of the family physician, who assumed all the responsibility, he operated for the removal of adenoids, which proved to be very large for a child of that size. The patient was well cared for afterward, but despite this, severe hemorrhage followed, and in fifty-six hours the child died. The case was not unique. The operation was indicated, and probably had very little to do with the bleeding.

Dr. Lutz asked if any one had had experience with "Coagulin," made by Parke, Davis & Company, from sheep serum. It is put up in ampules, dry and sterile, sterile water to be added when used. It is administered by hypodermatic intramuscular injection. It can also be used dry on a bleeding surface, and quickly causes a clot.

Dr. Joseph A. Kenefick mentioned the case of a girl, seventeen years of age, upon whom he had operated for adenoids. She was anemic. There was a history of hemophilia which, for some reason, the family physician did not give. All blood and other examinations were made. He found, to his great surprise, that he had operated upon a hemophiliac. The hemorrhage was persistent and severe, and was controlled for a day or two by packing. Finally he resorted to the use of horse serum, two doses of 50 cc. each. He was unable to state whether the clot occurred in consequence of the packing or the horse serum. At all events, the "serum sickness" was extremely severe. The glandular swelling and fever lasted for several days. Under hot mustard poultices the glandular swelling subsided. Many cases have been reported in which a clot was secured by the use of horse serum. He referred in this connection to the work on hemolysis which had been done at Mount Sinai Hospital.

Dr. Sheppard, in closing the discussion, said Welch had had good results in the newborn with the human serum. It was possible to get the serum within an hour or two. The Jewish Hospital of Brooklyn kept this human serum always on hand. They get it from the obstetrical ward, using therefor placentæ giving a negative Wassermann reaction. The question of risk of introducing spirochetæ had been raised, but no trouble in this regard had been experienced.

Suppuration Following Aural Douching.

Dr. Harris spoke of the mechanical effect, in certain cases, of water upon an old suppuration of the middle ear. For a long time he had thought it a coincidence, but now he is forced to believe that there is some relationship between the use of hot water and the recurrence of suppuration. He had recently noted this in two cases. Each patient came to him for what was thought to be earache. He found impacted cerumen. One had had no suppuration for seven and the other for ten years. Without any instrumentation whatever, and with unusual precautions, the ear was syringed with boiled water. In each case there resulted a suppuration which has been persistent and profuse. Whether the wax, remaining so long in situ, had covered a nest of bacteria which had accumulated there, and which multiplied rapidly when uncovered, he did not know. At any rate, the experience and the results were annoying. The bones were destroyed in each case. One patient was a lawyer, sixty-five years old, who had been treated as a child by a seton put in his arm.

Replying to a question by Dr. Whiting as to whether the supposed cerumen might not have been inspissated discharge, Dr. Harris said there was an inspissated discharge later, but the plug which he removed was characteristic cerumen. There was no trauma at all. The cerumen was very dry, and there was no pus behind it. There had been no discharge for years.

DISCUSSION.

Dr. Lutz said it was not an uncommon experience to clear out impacted cerumen and to find a large perforation in the drum membrane and a tympanic cavity filled with discharge. He had seen suppuration appear in an ear that had been apparently dry, and had considered that there was an opening in the membrane, that this had become plugged with cerumen, and that when the cerumen was removed the suppuration was started up again.

Dr. Harris, replying to a question from Dr. Berens as to how he knew the plug was dry, said this could be judged from the appearance of the plug. There were absolutely no symptoms. It would seem that the plug, acting as a tumor, would have been the cause of pain.

Dr. Berens said he had asked the question about the plug of cerumen being dry because several years ago he had a similar experience, and for ten years he had not used a syringe at all. He used instruments exclusively. If these plugs are examined, one will sometimes see a cast of the inner wall of the tympanum, frequently presenting a little moist point of pus. If examined, they would no doubt prove to be filled with bacteria.

Dr. Sheppard agreed with Dr. Berens with reference to douching, and was surprised that Dr. Harris laid emphasis upon the fact that he used no instruments. It had long been his practice to use instruments instead of water, particularly in old cases, and where the drum is known to be perforated.

Dr. Gruening considered the removal of a plug of cerumen by means of the syringe the most comfortable for the patient. Dry plugs could be softened with carbonate of soda, after which they could be easily removed. A patient with impacted cerumen might also have otitis media. Pain always indicated other trouble besides impacted cerumen. He believed the douche to be entirely harmless, but he thought the diagnosis of otitis media should be made before removing the plug.

Dr. John D. Richards called attention to the possibility of mistaking eczema of the canal for cerumen. The syringe used in this condition may set up trouble which might persist for some time. He also recalled a case of cerumen in which the syringe had been used to remove the wax, and this had started an eczema which lasted for four years and which was exceedingly annoying. This patient had never had eczema before, and since that experience he removed wax with instruments whenever that was possible.

Dr. Gruening added that when the canal is filled with a hard mass consisting not of wax but of desquamated epidermis, this accumulation can also be softened with carbonate of soda. It would be difficult to remove such a plug with instruments. When the soda has acted long enough the plug can be easily washed out. He never uses instruments in removing wax or any plugs which form from continued desquamation. This desquamation is not black, but of a yellowish white color.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, December 16, 1913.

DR. GEORGE W. BOOT IN THE CHAIR.

Paper: Lip Reading for the Adult Deaf.

MISS GERTRUDE TORREY, of Chicago: Some people find lip reading hard to learn—others find it comparatively easy. This is due to a difference in the type of mind. Teaching lip reading becomes a psychologic problem. The theory and basis of lip reading can be mastered in three or four months. Sometimes one becomes a fairly good lip reader in that time, but usually the first three months should be followed by from six months to a year or more of very thorough practice. A good lip reader can almost entirely overcome the handicap of deafness.

Every vowel and consonant has its own movement. Each movement is studied and then applied in words, in sentences, in stories, vowel exercises and consonant exercises are used, conversation practice, etc. The psychologic side is developed.

Successful lip reading depends upon the application of the principles. The most important point is a great deal of intelligent practice.

Miss Torrey gave a demonstration of two pupils—one entirely deaf, one very deaf—who carried on an impromptu conversation on various topics with her. They also talked with some of the physicians, and one spoke German with Dr. Beck, though all instruction in lip reading had been in English.

DISCUSSION.

MISS MARY MCCOWEN thinks that Chicago is fortunate in having Miss Torrey, because there are a great many people in Chicago suffering with partial deafness, more than can be taken care of by the teachers who give their time principally to teaching deaf children. There are in operation in the night schools of the city of Chicago classes for adults who are becoming deaf. Such classes are maintained on the south and north sides. But in these schools it is impossible to take care of all the people who wish instruction, because there are not enough teachers properly trained. The speaker's work has been very largely with little children. Speech reading is used, but it is purely incidental in the case of children. The first thing is to give these children an education, and speech is used as a medium of communication. With the adult, speech reading is, of course, a translation. It is learning another language. It is translating the language which we all know as a heard language into a language of movement. As Miss Torrey said, it is a language of movement, but the speaker would add that the movement is limited by the eyes. With adults the eyes may not amount to very much, but with little children we find that the eyes are very important, because the movement that does not begin at a definite point and end at a definite point does not get anywhere, and does not convey any definite idea to the child's mind.

Another point with reference to the speech reading of adults: It is a tremendous advantage for a person who is partially deaf to begin to get speech reading before he or she is acknowledged to be very deaf, for his or her own sake, and also for the sake of others. If the community reaches the conclusion that a person is deaf, and that it is difficult to communicate with him, before that person had acquired speech reading, he is forever handicapped. It makes no difference how well he acquires it afterwards. If everyone, the moment they began to feel that deafness was coming upon them, even in the slightest degree, would begin at once to watch the face and learn speech reading, either through a teacher or unconsciously, without a teacher, it would be of wonderful advantage. Many have acquired very excellent speech reading through their own determination. Deafness often grows upon people, and speech reading would perform its function better and better; and while speech reading never can take the place of hearing, yet the disability of deafness would be very greatly modified.

Dr. E. L. Kenyon said when one has reached the point in loss of hearing where ordinary conversation has become difficult, that person is bound to go through life with a great handicap. We all know this. The speaker merely wished to emphasize it. His mother was deaf from the time she was thirty years old, following typhoid fever. She was so deaf that she could not hear ordinary conversation in a room. She never had any training in lip reading—the doctor did not know what the status of lip reading was at that time, but the speaker's life is filled with realization of the pathos of deafness.

Of course, when an adult becomes deaf, he does not necessarily become totally deaf, as we all know. The point which he wished to emphasize was that one should conserve every bit of hearing that can possibly be conserved. One should not only cultivate lip reading in those that are deaf, but still have hearing, but he should cultivate increased capability of hearing for words. He would take up Miss McCowen's thought, that lip reading should be begun early, before hearing has been lost, and go further: He would say that training of the ear should be begun the moment, or as soon as possible after, the individual knows that he is to become deaf. We hear largely by hearing key sounds, particularly if we hear badly. These key sounds are sounds which give us a cue as to what the rest of the word is. So his contention would be that we should educate the hearing of these people by analyzing the words phonetically for them, with the idea of giving them an appreciation of the individual sounds in those words, so that they could better interpret the complete word from the part heard.

He wished to express his appreciation of the exhibition of lip reading. But we must bear in mind that, in the first place, not all individuals perhaps can succeed in lip reading like those shown, and in the second place, that not all individuals are talking with their own teacher, a trained lip reader, although, of course, he appreciated that these pupils talked with others, too; but what he wished to emphasize was that any aid which the deaf can have is to be brought into use, whether it be mechanical appliances for the ear, whether it be lip reading, or the education of the ear to appreciate what he called key sounds.

Possibly something could be done by this organization to inaugurate a movement for the education of the public in the matters of prevention and amelioration of deafness. How many people, for example, are acquainted with the value of lip reading to the adult deaf? Or how many are familiar with the importance of early teaching lip reading to the child who has become deaf? Or how many appreciate the necessity of early treatment of pathologic conditions affecting the ears? Such a social work of education is being done for the eye, and should be done also for the ear.

Dr. Joseph C. Beck said that we are having less deafness than formerly, which he believes is due to the fact that we recognize the etiologic factors producing deafness. Of course, this does not refer to cases of congenital deafness, but to cases of acquired deafness.

As long ago as last year, in discussion at the State meeting, did the speaker voice an opinion against this attempt to teach the hard hearing individuals lip reading, and he thought, as Dr. Kenyon mentioned, to stimulate the hard hearing people to try and hear without watching the lips, and so stimulate the auditory nerve and the acoustic apparatus so that it would be kept in action. He always remembered this lesson from Professor Zaufal, who insisted on that. But he believes now, and is willing to be convinced, that the mistake is perhaps made too often the other way, in waiting too long. Especially is this the case in otosclerotic individuals, and he has now under observation several patients of this form who are being instructed in lip reading.

Of course, some people learn lip reading readily, as he would show by the demonstration of a case, but others find it very difficult. For instance, he has a patient, thirteen years of age, who is practically deaf, but who does not respond the least bit to lip reading.

Something might also be said on the side of the question that many people run their words together in speaking, or there is not much lip action, or people do not accentuate clearly, and so that is a difficulty in understanding them, especially for hard hearing people.

Presentation of Patient.—Young woman, twenty-four years old. Diagnosis, otosclerosis. Practically deaf for seven years, and hard hearing since eight years of age. This young woman is a perfect lip reader, and never has had a single lesson. The hearing test in this case shows that only the loudest whistles can be heard. (Demonstration of patient reading the lips of various individuals.)

Dr. J. R. Fletcher asked Dr. Kenyon, since he had had experience with deafness in his family, what he considered the relative catastrophe between deafness and blindness?

Dr. Kenyon said he did not know that he had an intelligent answer for this question, but that Miss McCowen might have. He has never analyzed it carefully enough to know. It might be somewhat temperamental with the individual, and also depend somewhat upon the life conditions of the individual. On the whole, he is inclined to think that deafness is a more serious affliction than blindness. There is something so essential to human contentment that people should be able to carry on quick thought with those about them. It seems to him that it must be exceedingly hard to bear that one is unable to do that.

Dr. J. R. Fletcher mentioned this because a gentleman voluntarily said to him the other day that it seemed to him deaf people are far worse off than the blind. This man said he had lived with two uncles, one deaf and the other blind. The blind man was one of the happiest men, and the sweetest natures. The deaf uncle was mean, morose, melancholy and suspicious, and generally disagreeable, and life was not worth while. This man said that he would choose blindness, if necessary, of the two afflictions.

Dr. Otis H. Maclay had been very much pleased with Miss Torrey's paper and the discussion, and believed all the members would join with him in this expression of appreciation.

There is one point otologists should consider, namely, that when patients are not being helped, they should be advised to learn lip reading. It would only be fair to them as well as to the profession as a whole.

A future meeting of the Society might be arranged, where we could follow out some of the ideas brought out at this one.

Dr. J. Holinger asked what is the pathology of these cases? Most frequently they are otosclerosis, starting at the age of sixteen, eighteen or twenty. As soon as we notice that the patient is going beyond the usual degree of hard hearing, where he cannot very well understand conversation, then he is certainly a subject for lip reading. Hearing exercises are of no value.

In labyrinth deafness after infectious diseases, scarlet fever and typhoid fever, etc., the deafness is from the start of such a degree that lip reading is absolutely necessary.

In hard hearing caused by chronic suppuration of the middle ear the danger to the life of the patient is often more important than the function of the ear.

Miss Torrey, in closing the discussion, referred to the thought suggested by Dr. Beck, on the possibility of lip readers not trying to hear. As a rule, a person who is deaf and who is not a lip reader does not try to hear unless addressed personally. He thinks it is too hard, or useless, and he is apt to become engrossed in his own thoughts. This fact is admitted by many who are deaf. Successful lip reading calls for absolute concentration and for great mental alertness which reacts upon all the senses, making them more sensitive to the impressions they receive. A good lip reader sees more and feels more than the average "normal," and probably hears more than one who is not a lip reader, of the same degree of deafness. For the mind is ready to respond to anything that will help in understanding, no matter through which sense the help comes. And for this reason it seems probable that the ear is used fully as much as in the case of one who is not a lip reader.

Paper: Diseases of the Antrum.

Dr. Truman W. Brophy, of Chicago: The clinical experience of an oral surgeon is filled with examples of early neglect of the teeth, and this neglect is manifested in the development of many diseases, some of which are of the gravest character. Ninety-seven per cent of all people have diseases of the teeth. The teeth, therefore, are more subject to diseases than any other tissue of the body. The physician should have some knowledge of the symptoms produced by diseased teeth. It is through this lack of knowledge that many operations about the face are failures. The making of external incisions through the face, based upon an erroneous diagnosis, is an unwarranted procedure, yet it is of common occurrence.

The anatomy of the antrum was then taken up in detail. Following this, the author opened a discussion upon empyema of the antrum. When we realize that the apices of tooth roots often penetrate the antrum, the prevalence of dental caries, pulpitis, infection of dental pulps, infection of the pericementum by reason of the decomposition of tooth pulps, the passage of pathogenic microorganisms through the apical foramen, the formation of dentoalveolar abscesses, and, further, keeping in mind that pus will, as a rule, make its exit through the surface which affords the least resistance, it is easy to understand why empyema of the antrum so frequently follows the formation of dentoalveolar abscesses and other infections of dental origin. A tooth with a dead pericementum is like a piece of necrotic bone; it should be taken away. Suppurative dentoalveolitis unquestionably may be the cause of empyema of the antrum. This is frequently overlooked. Empyema of the antrum may also follow rhinitis, infection of the frontal or accessory sinuses, foreign bodies in the antrum and diseases of the nasal tract. It also comes as a result of careless handling after removing a tooth. The antrum may be punctured by the examiner and infected material forced into it. Fully seventy-five per cent of the cases are the result of some dental lesion. The surgeon should use every means at his command to determine the vitality of the teeth in empyema of the antrum.

The symptoms of empyema of the antrum followed this discussion. In the diagnosis of this condition it is not necessary to open the antrum through the nose, as a small opening may be made in the canine fossa and the cavity flushed out by inserting a syringe. The dental engine may be used here advantageously. Transillumination and X-ray pictures should be brought into service. It is essential to examine all the teeth.

In the treatment of empyema of the antrum it is necessary that thorough drainage be established, and that polypi, diseased teeth and bone and foreign substances be removed. The removal of a sound or diseased tooth for such a purpose is not warranted except where the tooth is not firm in its socket. Although diseased teeth may have been the primary cause of the condition, they are often amenable to successful treatment. The importance of the function of the teeth demands that they should be cured, if possible, and restored to usefulness. The various operations for the cure of empyema of the antrum were then discussed. Regarding the openings made into the antrum through the nose, the author stated: "Nature created an aperture of communication, the ostium maxillare, between the nose and the antrum. It is the surgeon's duty, in case this opening has been closed by adhesions as the result of inflammation, to open it and reestablish its function, instead of making a large unnatural opening at the base of the nose through which dust and mucus may enter the antrum, thus becoming a constant irritant and making the permanent cure of the disease impossible."

Any operation for the treatment of chronic empyema of the antrum which does not admit of an ocular examination of the antral walls is extremely faulty. In nearly all cases of chronic empyema, polypi are seen. It is their presence which explains the failure of cure in so many cases treated through small openings. To treat the antrum in such a manner as will give the surgeon a complete understanding of the exact condition of the part, a large opening through the canine fossa should be made. After the patient is anesthetized, the lip is reflected upward and an incision is made one and a half inches in length directly above the cuspid tooth root. Another incision is made downward a half inch above the first one, and the periosteum elevated so as to leave a considerable area of bone exposed. The cavity is then punctured by means of the dental engine and a bur. A button-shaped piece of bone is removed and the finger introduced. Polypi are curetted and foreign bodies removed. The mucous membrane in the walls, if possible, is not disturbed. The antrum is then dried with sponges and the cavity packed with sterile gauze. The gauze is changed every other day for ten days, when an antral plug is made and placed in the opening. This is kept in until the walls of the antrum are normal, which is determined by illuminating.

DISCUSSION.

Dr. C. M. Robertson said there are some points about diseases of the antrum that Dr. Brophy did not mention, and which the speaker thinks are not generally understood. One is that antrum diseases are sometimes caused by posterior ethmoiditis and sphenoid abscess. He noticed in some of the pictures that the laminæ that were present in some of the antra were more complete than in others. This was due to the formation of the antrum in early life, in which the ethmoidal cells pushed down. Those are ethmoidal cells; they are not part of the antrum. That is particularly so in the posterior part of the antrum, and in cases in which we go through the antrum as the short route to the sphenoidal sinus, we often find a posterior eminence, which is a posterior ethmoidal cell, very prominent, and in some cases it dips down, so that it fills half of the antral cavity. If absorption goes on far enough the wall of this posterior ethmoidal cell is done away with, leaving only a lamina, which might appear as though there were a partition in the sinus itself, and part of the sinus, rather than being a remnant of the posterior ethmoidal cell. Those are the inferior cells of the ethmoid, just as we have the superior cells going over the orbit, and the cells that go down into the middle turbinate, the middle cells. This condition Dr. Robertson has noticed very frequently in the cadaver.

Regarding the etiology, of course, the dentist requires that everything comes from the teeth, so that Dr. Brophy says that seventy-five per cent of the cases occur from dental origin. We will in turn give him twenty-five per cent, and say seventy-five per cent occur from nasal origin. We will have to admit, however, that most of the cases show a caries in the molar teeth.

We have cases of nonsuppurative inflammations of these sinuses. The first man to discuss and write about this was from the middle part of New York State, and the speaker believes that he was the next one. Then Dr. Brawley, of Chicago, reported on a number of cases with all the subjective without the objective symptoms of empyema. They are just as suspicious as the cases where pus is present. They are cases of stenosis of the maxillary ostium in which there is a hypertrophy or a bony cystic degeneration of the middle turbinate occluding the ostium.

One of the most common symptoms that we have to treat in connection with antral diseases is the condition that occurs in the respiratory tract further down, resulting in asthma, bronchitis, and the reflexes that occur from the pus in the nose. The objective sign—pus in the antrum—does not mean anything—we can have it from so many causes. As stated before, we can have it from a sphenoid sinus coming from behind downward; from the posterior ethmoidal cell in the same direction; from a middle ethmoidal cell, and we very frequently have it as a reservoir from an ethmoidal cell or a frontal sinus.

Bosworth has reported one case in which there was pus in the antrum for thirty years, draining from a frontal sinus, and the antral mucous membrane remained normal. Thus we must be careful about our objective signs.

Walter's negative pressure apparatus the speaker had never heard about before, but he had heard of other negative pressures, and it is hard to imagine a better negative pressure than the Brawley pump or the pump of Dr. Pynchon.

Puncture through the canine fossa has always been objectionable to Dr. Robertson, on account of, first, infection that occurs in the mouth from the nose, and, second, in the antrum from the mouth. The antrum is a nasal accessory sinus, and it seemed to the speaker that drainage should be made in the place where nature intended it to be. We do not recognize the alveolar process as a place for draining. Neither does Dr. Brophy. Dr. Brophy's canine fossa, or the Caldwell-Luc route, is a more direct and better one than the alveolar. But the antral wall of the inferior meatus, in the speaker's opinion, is the selective point. He read a paper on radical operation on the antrum about five or six years ago before the North Side Medical Society, and it was at that time criticized. It was said that it was impossible to do what he said he could do. He has demonstrated time and time again that he can operate upon the antrum of Highmore and cut away the entire inferior wall—that is, the wall in the inferior meatus—and save the entire inferior turbinate body, so that anybody looking into that nose could not tell that the antrum had been opened, and at the same time the antrum has an opening of the entire extent of the inferior meatus. This, to his mind, is a better operation than the Denker or the Caldwell-Luc, or the operation of Dr. Canfield, and it is very easy of accomplishment. The operation is done exactly the same way Dr. Brophy does, so far as entering the antrum. After the antrum is entered, the maxillary wall is cut away, down to the nasal wall, so that you can see the attachment in the antrum of the inferior turbinate body, which is a decided ridge, always running from before backward and downward. In this operation the nasal mucous membrane is saved. We do not go into the nose until the operation is completed. In doing this, if care is taken to cut away the bone at the top of the supposed wound-to-be, going along the attachment of the inferior turbinate as far as you wish to make your opening, and then tearing down the wall to the floor of the nasal cavity, we can level off, no matter whether the antrum goes below the floor of the nose, or on a level with the nose, or above. In this we do not have any place for the pus to collect. After that wall is completely dissected away, the mucous membrane of the nose having been left intact, not having as yet been perforated, the floor of the antrum and the floor of the nose being on the flush absolutely, then the cavity of the nose is opened by a sagittal section through the mucous membrane, making four flaps, and the four flaps are then folded back into the antrum. It is the same thing as the Denker operation contemplates by one flap, but Denker is careless about the technic, so that he has a mucous membrane that does not attach, and therefore the antrum fills up again by granulation. If you are very particular, folding the flaps around the corners of this newly made opening into the nose, and holding the mucous membrane flaps of the nose in place by packing, the opening becomes permanent just as you leave it, and the inferior turbinate is not touched at all. In that way the dirt does not fall in, there is no mucus, there are no crusts, and nobody would ever know that that antrum had been opened, although you have an opening equal in extent to the amount of bone cut away from the inferior meatal wall. The buccal cavity is closed as the last step of the operation. The packing is left in long enough for these flaps to attach, and that is all the treatment necessary. There is drainage produced, and our distinguished friend, Dr. Brophy, after he produced his drainage, which he says it is essential to produce, and all that is necessary, then tells us about therapeutics. That part of the paper Dr. Robertson would criticize. There is no necessity for therapeutics. He never washes these cavities out after operations. He has never seen one case of scabbing, and he has never seen a case with permanent discharge, except where necrosis is extensive. He leaves the dressing in for five days, it comes out easily without tearing the flaps loose, and there is a permanent opening that does not show. And that, to the speaker's idea, is a classical operation. He has performed it for five years. He has examined these cases repeatedly to see if they remained as he left them, and they did.

The speaker believed with Dr. Brophy that we should be conservative of the nasal mucosa, because that is a most important physiologic tissue in the body. It is a respiratory tissue, and it is wrong to injure these tissues in any way, when it can possibly be avoided.

Another thing: There is a difference between polypi and exuberant granulations. His idea is that very many cases of empyema of the maxillary sinus have no polypi at all. They are all exuberant granulations. One is a product of heat and moisture; the other a myxoma which is a true growth.

Dr. Freer said a polypus was an inflammatory product, not a myxoma.

Dr. Robertson said it was an inflammatory polypoid edema —granuloma. He has a patient, whom he has exhibited on various occasions, who has a bilateral empyema of the maxillary sinus of some years' duration, and her nose is still full of socalled polypi. This woman's antrum is washed out by means of the ordinary grooved Kraus cannula, and after two or three days she will blow polypi out of the nose. In a condition like that, if you produce drainage, the polypi will shrink up. Those are exuberant granulations, and as soon as you take the moisture away the things disappear. He has had several cases recently in which molar teeth were found in the antrum, one against the nasal wall in the anterior corner. The most important part of the whole operation—to get the anterior apex of the antral cavity as clean as this—is the point most apt to present persistent granulations.

Dr. Otto T. Freer said that Claoué, of France, and Rethi, of Vienna, followed by Holbrook Curtis, in America, were the first to intranasally remove a portion of the nasal wall of the maxillary antrum for the relief of empyema. Dr. Freer was the first to perform and advocate the operation in Chicago. His first case was presented to the Chicago Laryngological and Otological Society, in 1904 (*Illinois Medical Journal*, 1905; *Laryngoscope*, 1905). The perfected method was described in *The Journal of the Michigan State Medical Society*, 1912. Experience has only confirmed Dr. Freer's impression of that time, that the ideal method for the relief of chronic antral empyema is the intranasal resection, with bur and trephine, of a large part of the nasal wall of the antrum in the inferior meatus. Had Dr. Brophy seen Dr. Freer's results, he would not have mentioned as facts theoretically reasoned evil consequences. With only rare exceptions the patients recover in a few weeks, and stay well, and Dr. Freer has seen none that suffered from the drawbacks spoken of by Dr. Brophy. After the bone wounds are healed there is no scabbing, there is no chronic mucous discharge, and the mucous membrane, both within and without the antrum cavity, looks moist, pink and healthy in all but the very rare complicated cases.

In the exceptional cases, where pus continues to come from the antrum after the operation, it usually does so because the antrum acts as a receptacle for discharge from a suppurating frontal sinus. Caries, polypi, irremediable degeneration of the mucous membrane and ulceration are conditions given a prominence in textbooks that would make them seem not unusual complications of antrum suppuration, while in reality they are extremely rare, the rule being that inspection through the intranasal opening shows the mucous lining of the antrum to be normal and not even thickened. The level of the floor of the antrum below that of the nasal cavity does not interfere enough with drainage to be of moment.

Not only does an opening through the nasal wall open the antrum into the cavity with which it is intended to communicate—that is, the nasal cavity and not the mouth—but the nasal wall of the antrum is anatomically its least important one, and it is only where direct access to the antrum is demanded for such conditions as tumors or caries that the route through the facial or, as it is also called, buccal wall should be chosen, for this highly organized wall contains the roots of the teeth and the anterior dental nerve. In fact, an opening through the facial wall is, in all but the rarest cases, an objectless mutilation.

For these reasons the simple operation through the nasal wall should supplant for all but complicated cases of chronic antrum suppuration, the needlessly formidable Caldwell-Luc, Denker and Canfield operations, which interfere with the facial skeleton and are seldom necessary. I emphasize this because, even after so many years, the intranasal operation is not yet generally appreciated, and patients are unnecessarily being subjected to the extensive procedures mentioned. The chief reason for the popularity of entrance to the antrum through its facial wall is the unfamiliarity of the average surgeon with intranasal work, so that the easier direct way is chosen, to the patient's detriment.

The resection of the nasal wall of the maxillary antrum in the middle meatus, practiced by some, has the serious objection that the orbit is in danger of penetration, and it has been penetrated by puncture in this region. The opening obtainable in the middle meatus is a narrow slit which does not permit of inspection of the interior of the antrum, as does the opening in the lower meatus, while drainage is poor, as the opening is at the very top of the antrum. There are cases where the pus in chronic empyema clots into a mass of cheese, which lies in the bottom of the antrum and requires a large opening for its removal. The middle meatus route is not even good for diagnostic puncture with a trocar, for in washing out the antrum through the cannula of the trocar the return flow may bring clear water, the entering stream having merely flowed over the thick pus lying in the bottom of the antrum. I describe this from my own experience.

As an examule, Dr. Freer relieved a young woman of a double antrum suppuration by broad openings in the lower meati, after openings through the middle meati by another operator had been of no avail. The only excuse for choice of the middle meatus route is that it is an easy one.

As Dr. Freer operates, his first opening is made for diagnosis. He is as fond of the dental engine as is Dr. Brophy, and regards it as typifying the genius of oral surgery, which Dr. Brophy has done so much to advance. General surgery can show no such beautiful instrument. A large trephine driven by the engine is introduced underneath the inferior turbinate, after previous cocainization with pure cocain in the form of flake crystals. The trephine's cutting edge is pressed against the nasal wall of the antrum as far forward in the lower meatus as possible by crowding the shank of the trephine against the flexible cartilaginous septum, which is bent over by it towards the other nostril, the trephine thus being made to cross the naris of the operation at an angle of about forty-five degrees. The power is then turned on, and in the usual case instantly and painlessly a smooth oval hole is made in the antral wall large enough to permit the use of a large eustachian catheter for washing out the antrum, with plenty of room to permit the escape of clots beside the catheter. In distinction to this the trocar and cannula usually employed cause great pain in making the puncture, create a stellate fracture, and often fail to penetrate at all where the bone is thick in the lower meatus. In addition, the cannula tightly fills the opening made, so that there is no room for a counter current beside it, and none is possible where the natural opening of the antrum is closed by swelling or polypi.

If the diagnostic opening with the trephine brings pus from the antrum, the opening, in mild cases, is merely enlarged underneath the lower turbinate with the trephine and bur, without cutting away any of the turbinate. This leaves hidden under the turbinate a large aperture, which is apt to close, but usually not before the suppuration has ceased. In most cases, however, in order to get a surely permanent opening, the anterior one-third to one-half of the inferior turbinate has to be resected by Dr. Freer's flap resection, which preserves the mucosa of the convexity of the turbinate, which curls into the aperture in the antrum, and giving it a smooth edge above. After the turbinate resection the diagnostic trephine opening is enlarged with the bur and cutting forceps until it takes in all of the lower meatus down to the nasal floor. The mucosa of the antrum's interior is left intact and is not curetted. It is usually normal or capable of becoming so, if left alone. The operation leaves no denuded surfaces to granulate, for the bone opening always exceeds the opening in the mucosa, which gets out of the way of the bur. In fact, it is due to concentric contraction of the mucosal opening that the aperture always loses half of its area after healing, and, if not made large enough, it sometimes closes up again by a membranous diaphragm. For this reason redundant mucosa must be cut away in the operation. The complete operation may be done under general or local anesthesia, the latter usually being employed.

Dr. Joseph C. Beck said that first he would like to object to Dr. Robertson's reference. He never said that the operation could not be done. He said he would not want to do it in that manner.

Dr. Beck enjoyed Dr. Brophy's paper immensely because it agreed with many of his own sentiments regarding the treatment of suppuration of the antrum. The one criticism that he would like to make was that not enough attention was paid to the pathologic lesions that we deal with. It makes a big difference as to the change in the tissues in a chronic suppuration of the antrum. A case may be chronic, yet, as suggested by Dr. Freer, if well opened up in the inferior meatus, will get well, because we drain and ventilate the cavity—especially is this the case if it is not associated with infections of the other sinuses.

A chronic osteitis associated with chronic suppuration of the antrum will not get well by an opening in the inferior meatus, no matter if it is as big as a house. It is a pathologic process that must be eradicated by thorough curettage and obliteration of the entire cavity. This has been his practice in cases that will not get well by an opening in the inferior meatus.

The speaker asked Dr. Brophy what took place in that cavity when he had scraped the bone and put the plug in. Certainly, not mucous membrane. It must be a scar membrane. A closed cavity lined with scar will suppurate. He said this from experience, because he has reopened these cavities.

His method of dealing with chronic suppurations, after trying simple operations, is to obliterate the cavity as nearly as possible. He has now sixteen cases on record that have been treated and cured by this operation.

Dr. George E. Shambaugh, in speaking of the etiology of antrum infection, stated that before the development of rhinology these cases were handled almost exclusively by the dentists, and the conclusions expressed by Dr. Brophy that most of these cases are caused by dental infection corresponds with the view that was generally accepted before the advent of rhinology. Most of the cases that come under the observation of a dentist no doubt have dental origin; the dentists are consulted because of the teeth, or the patients come to the dentist because of an acute pain in the side of the face, following distinctly an alveolar abscess, of which the patient has been aware. The rhinologist today sees many more cases than go to the dentist; he sees not only the cases of dental origin, but those that have their origin from infection of the nose. The rhinologist has found that a relatively small percentage of cases of antrum infection have a dental origin.

The speaker in listening to the discussions was surprised that in the suggestions regarding treatment nothing had been said regarding the easiest and very often the most efficient way of making an opening into the antrum. This is by breaking through the thinnest portion of the antral wall, namely, the socalled nasal fontanelle, which lies in the middle meatus. Here there are areas of considerable size where the antrum is separated from the nose simply by the mucous membrane coverings. In an exploratory puncture of the antrum for irrigation, in making a diagnosis, this is by far the easiest and best way for entering the antrum. In cases of acute empyema of the antrum it is very unusual that one has to resort even to any artificial openings. In treating chronic cases of antrum empyema Dr. Shambaugh has been able to cure a great many cases by making a large opening in the middle meatus of the nose. In his opinion this is very often the method of choice in undertaking the cure of a chronic antrum infection. There are cases, however, where it is impossible to get a satisfactory result by working through the middle meatus. In cases where a more radical procedure is called for, the Denker operation gives us our best chance for eradicating the trouble.

Dr. J. R. Fletcher was rather surprised that nothing had been said of the bony cysts which have been shown in various works to be sometimes so enormous that they almost entirely fill the space which should be occupied by the antrum of Highmore. He is rather of the opinion that they are much more numerous than is generally thought. If we enter habitually through the canine fossa, we will now and then be dealing with a suppurating dentigerous cyst, and have no communication, except in very rare instances, when the communication is formed by the death of the bone posteriorly. He would think that dentists would have more opportunity to find these than rhinologists, but perhaps rhinologists do not find them as often as they might, because they do not look for them and keep them in mind. The speaker read a paper on this subject before the Society three or four years ago, which some of the members might remember.

He was further very much pleased to hear Dr. Shambaugh call attention to the route of the middle meatus. That is certainly the easiest point to make your entry. Oftentimes, instead of going through the elaborate procedure mentioned by Dr. Brophy to find if there is pus in the antrum, it is advisable to have an easier route, and the one spoken of by Dr. Shambaugh is the easy route. Quite a large percentage of cases are cured when we go between the middle and the inferior turbinates. He is not of the opinion that the antrum must be on the level of the inferior wall of the nose, in order to give good drainage. The head is not fixed—it is decidedly movable.

Dr. J. Holinger thought the members were dealing with a borderline subject, and of course each one finds what he is looking for on his side of the fence. Each one may have his justification. But he would call attention to the patient exhibited by Dr. Brophy. He had treated her for many months through that opening. Even though the suppuration stops temporarily, did Dr. Brophy think that he had a normal mucous membrane in there? Did Dr. Brophy make a microscopic examination of the membrane? After all the manipulations, it is impossible that there can be a normal lining of an antrum of Highmore. Sooner or later, if he allows the opening to close, the cavity will suppurate again. This is the clinical experience of rhinologists of the last twenty years, and is supported by microscopic findings.

After scraping out the mucous membrane you have nothing else to put in its place except granulations. You leave a granulating and therefore suppurating surface. Denker does not destroy any mucous membrane of the antrum except the floor, which he covers afterwards with the mucous membrane of the lateral wall between the antrum and the nose. In a week the patients are cured, and safe from relapses. Dr. Brophy treats his patients from six to nine months. The speaker's patients would not stand for that, and he would not expect it of them, so long as he can cure them in a week. If Dr. Holinger sees that after three or four washings of the antrum with boric acid solution he cannot make headway, that the discharge and odor do not diminish, he tells them to go to the hospital, where a radical operation is performed. He has never seen a suppuration recur, but even if that should happen, the patient can easily wash out the antrum himself through this permanent opening. He has never seen any trouble after a Denker operation, but he has seen a lot of it after other operations.

Dr. Otis H. Maclay said the essayist had spoken of doing the work with the least manipulation and the least sacrificing of tissue, and he thought that everyone agreed with him in that, and it is only a matter of where to place this. It seemed to him that, on the basis that ventilation plays equally an important factor in the work as drainage, we do not need to get a great big opening in order to cure these cases. With a fairly good opening in the middle meatus, we run a good chance of curing many of the cases, and he is of the opinion that we ought to do that first in all cases—at least give them a chance, and, if necessary, further work can be done, but the middle meatus route should be adopted first.

Dr. John A. Cavanaugh wished to call the attention of the members to a few specimens of the antrum which he has, especially as Dr. Brophy mentioned entering the antrum through the canine fossa. He has two or three specimens where the antra were very small, and in such cases this operation is absolutely impossible. The speaker had a case a year ago, in which a dentist had gone through the canine fossa, thinking he was in the antrum. At first Dr. Cavanaugh thought so, too; but, the trouble persisting, he passed a probe into the opening through the canine fossa, and, looking into the nose, found that the probe passed into the lower meatus of the nasal cavity. The opening was not into the antral cavity at all.

Dr. Cavanaugh believes that all the accessory cavities that are found in the cheek bone, otherwise than the one which opens from the infundibulum, are not antral cavities, because the antrum itself develops from the middle meatus, directly from the lower part of the infundibulum. The maxillary process of the inferior turbinate forms the inner wall of the antrum, so no matter how small the antrum is, if a needle be passed underneath the inferior turbinal, about three-fourths of an inch, from the anterior end at its attachment to the lateral wall, it will always pass directly into the antral cavity, regardless of the size.

Another thing: In going through the alveolar process he has found that just anterior to the molar ridge is the thinnest part of the anterior wall of the antral cavity, and in passing a bur or a needle upward in the direction of the supraorbital foramen, it will always pass into the antral cavity.

Dr. Brophy, in closing the discussion, thanked the members of the Society for jumping on him so lightly. However, he had this consolation, that while the speakers might not agree with him, they had also failed to agree with one another.

He was greatly pleased with Dr. Robertson's remarks, and was pleased to hear that he does not destroy as much of the bony wall between the antrum and the nose as some of the others. He saves the mucous membrane and preserves the integrity of the antral cavity and of the nasal cavity. He endeavors to restore, in other words, what he takes away. The surgeon who has the highest aims must keep in mind the importance of preserving the anatomy of the parts upon which he operates.

Nature made this cavity for a purpose. It provides a natural opening through which air and fluids may pass. It becomes our duty as surgeons to endeavor to reestablish that opening, if by some cause it has been closed, and enable nature to perform her functions normally. The criticism he would offer on Dr. Robertson's questions is that sometimes the membrane does not reunite, and then there would be a calamity on his hands—an unnatural opening through which dust and dirt and fluids and waste and incrustations might develop. Nature provided the ostium maxillare and put it in a place where dust and dirt cannot be readily admitted, above the inferior turbinate bone, and it should be preserved or reestablished, if for any reason it has been closed.

Dr. Robertson said that usually you find carious teeth when there is disease of the antrum. The speaker wished to ask, in all fairness, if the members did not think that sometimes they overlooked a tooth with a dead pulp, which was absolutely sound so far as external appearances indicated, and that the infection may have arisen from this source? He personally had no doubt of it.

How does the rhinologist know that these teeth do not contain dead pulps, when the expert dentist, with all the facilities at his command, finds it difficult to determine whether the pulp in a tooth is living or dead? Part of the pulp may be living and part of it dead. Such a condition may be misleading to the observer.

It is true that a large opening through the nasoantral wall will admit of good drainage so that the constantly forming pus at the root ends of teeth may easily escape, and inasmuch as it is not retained in the cavity the patient is not subjected to great discomfort.

Medical colleges have not taught diseases of the teeth. Medicine is said to be the healing art in all its branches. It is not any such a thing, except in part of its branches. Some few colleges are teaching dental pathology—others do not teach it at all.

Regarding Dr. Freer—there is some hope for him, because he has given up extensive cutting out of the nasoantral wall. The speaker would have been glad to give a fellow countryman the credit for the operation, if he had known his name. He is glad that Dr. Freer uses the dental engine.

Some speaker referred to the "elaborate way" he had of opening the antrum and the more simple way of going in through the nose and around the corner. Who can do it quicker than the speaker, with this engine? You don't need to make an incision. The thinnest part of the wall is just above the canine fossa: you put the instrument in place and in a second the antrum is opened; introduce a small-pointed syringe and flush it out, and if there is any pus in there, you know it.

Dr. Beck asked what you will find in an antrum that you open and curette. In many you find nothing but pus—no membranes at all. The bone is denuded absolutely. What will happen to that kind of an antrum?

Dr. Shambaugh's plan of opening through the middle meatus is probably a most excellent one. The speaker has never tried it, because he thinks he has a better way.

Dr. Fletcher spoke of dentigerous cysts and their involvement of this cavity, and of the elaborate care that the speaker pursued in opening the antrum, which is positively the quickest way. Dentigerous cysts do involve the antrum, but Dr. Brophy does not regard them as the cause of empyema, except in rare cases.

Dr. Holinger spoke of normal membrane. He does not agree with anybody else who spoke. He believes in the Denker operation.

In these old cases that have been running on for a long time, the speaker does not generally find any membrane on opening them—he finds nothing but bone denuded of all tissues.

Dr. Cavanaugh spoke of the importance of getting into the most difficult part of the antrum operation—getting into the anterior cavity. That is why Dr. Brophy opens it as he does. He can see every part of the cavity. If it is diseased anywhere, if fungi are present or exuberant granulations anywhere, he can take them out through this opening very easily.

Nothing had been said about the numerous cavities into which the antrum is sometimes divided, nor how to wash out these cavities. What better way is there of getting access to these cavities and breaking down the wall than by the methods described by the speaker? Many an antrum has been opened and treated, and then another cavity of the same antrum was filled with pus and not treated at all. What we want is to get out all the septa of bone, which will enable us to determine that we have freed the parts from infection.

Dr. Brophy then gave Dr. Maclay, the Secretary, a note from Dr. Homer M. Thomas, who was to have been present to discuss his paper, which read as follows:

"Dr. Homer Thomas is unable to be at the meeting tonight, but wishes you to know that he heartily indorses your views and the position you have taken, and with you believes the only way to properly open the antrum is through the dental arch. He would be glad to have you use his name as expressing this opinion."

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, February 17, 1914.

DR. OTTO J. STEIN, PRESIDENT, IN THE CHAIR.

Perversion of the Function of the Thyroid Gland in a Child Eleven Years of Age.

DR. GEORGE E. SHAMBAUGH: A little girl, eleven years of age, general physical condition well developed. Child apparently very alert mentally, but presenting as a most marked physical characteristic a perfectly flat nose, of which there appears to be no elevation of the bridge and no cartilage formed in the septum. There is no defect in nasal respiration. The child was referred because of suspected adenoids, for which she had already had an operation. In neither parent is there any suspicion of lues, and in neither family are there any hereditary defects. The child presents, also, in addition to the facial defect, a good many mental deficiencies, about which Dr. Shambaugh requested her teacher to make a statement.

Statement of the Teacher.—The child first came under the teacher's care about nine months ago. The teacher discovered that she had had some previous instruction and was able to read on three or four pages very quickly, because she had committed these pages to memory, although she did not recognize a dozen isolated words. The process of teaching the child was very slow, yet in the course of the few months' instruction the child now knows about three hundred words, learned by the word and sentence method. As far as reading and spelling are concerned, she learns as quickly as a slightly subnormal child, but in mathematics she is very deficient, and has not got beyond a realization of five. She writes fairly well for a child or five or six, although she is much older. Her mental development is perhaps five or six years behind. The teacher states that the child did not grow physically for four or five years; did not walk until she was four, nor talk until she was five or six. She has a rampant imagination and relates exaggerated stories, apparently thinking them true. One cannot rely at all upon statements which she makes. She has been well trained at home about her person, but associated with her in the school was a boy who had not been so trained, and when the girl learned what a commotion his neglect produced she began the same thing, but very quickly was brought to check this habit by restraining her from going out.

DISCUSSION.

Dr. J. Holinger said that the child presented by Dr. Shambaugh shows a number of charactristic features: The low nose, the nasal bones being hardly raised above the plane of the face, causing the tip of the nose to be tilted upward. The glabella is deep, which makes the eyebrows hardly project over the eyes. This, together with other features, drew attention to the thyroid. The part above both sternal ends of the clavicles appears sunken; you cannot feel any lobes of the thyroid. Over the trachea you hardly feel a trace of an isthmus of the gland. There is a deficiency of thyroid gland tissue.

Furthermore, there are a number of other symptoms in the case that point to defect of the thyroid. Early ossification of the base of the skull causes the very narrow anteroposterior diameter at the base of the skull, and explains the deep position of the glabella. The sutures on the top of the head cannot be felt, though in a child of the age of this one you would expect to feel a distinct elevation. Furthermore, he referred to the peculiar dry and scaly condition of the skin. Another point that is often mentioned in this connection is the thickness of the lips. Around the mouth the myxedema is more pronounced, but it is noticed to some extent over the whole body. Another point is the condition of the little girl's hair. It is coarse, sparse, and very dry.

Dr. Holinger thought it certainly would be advisable to start in with systematic medication with thyroid gland and watch the result. These experiments, especially in children, have been made very extensively in Switzerland. The speaker followed up the literature of those experiments very closely, and would be very much mistaken if some result did not follow in this case if systematic medication with desiccated thyroid gland were instituted.

Dr. George W. Boot thought the case is undoubtedly one that has some connection with perversion of the function of the thyroid gland. The tongue is large, and protrudes from the mouth a good deal of the time, which is a quite characteristic condition; also the dry, harsh skin. But the child lacks many of the other symptoms of cretinism. He has never seen a cretin so active as this child; they are usually dull and slow.

He has had under observation for a number of years an adult with the same characteristics of face that this litte girl has, namely, a deficiency of the nose, and the same enlargement around the mouth and tongue. The woman has been a very bright woman, with nothing strange about her until some five or six years ago, when she had some disturbance in the circulation of the brain, apparently a thrombosis of some of the smaller vessels, and since then she has become a typical paranoiac.

Paper: Variations of Sphenoid Sinus Disease.*

By George M. McBean, M. D.

DISCUSSION.

Dr. L. W. Dean said he had intended to bring a specimen that was of great interest to him—a postmortem specimen. The patient came into the department of internal medicine in the University Hospital a short time ago with a septic temperature, and the blood findings those of general sepsis. In addition to these findings, the only symptoms which the patient presented were a slight exophthalmos on the right side, and a marked papillitis of the right nerve head. The patient was sent down to Dr. Dean's department for examination, and an extensive pansinusitis was found, and a diagnosis made of cavernous sinus phlebitis, probably secondary to the sinusitis. In a few days the patient was so ill that it was impossible to con-

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*See page 419.

tinue the examination of the case, and he died a few days
noidal and cavernous sinus.
later. Postmortem examination showed a condition of pansinusitis. In the right sphenoid there was an abundance of polypi. There was a dehiscence of bone between the sphe-

Another thing occurred to him in connection with the discussion of sphenoidal sinusitis. Many patients come complaining of headaches at the base of the brain. If we talk to these patients we always find that they do not complain of headache at the base of the brain—it is either back of the eye, or occipital, or frontal, or on the top of the head, but they never localize it right at the base of the brain. It seemed to the speaker that if the patient had anything at all that would cause a headache at the base of the brain, it would be from trouble in the sphenoidal sinus. Nevertheless, experience has shown that these patients, when they have a headache the result of sphenoidal sinus infection, have a frontal headache, a pain back of the eye, or an occipital or temporal headache. The pain is characteristic in that it comes and goes, is a real pain, and is much worse in damp weather than in dry.

Dr. George E. Shambaugh recalled a few of these unusual sphenoid sinus cases. The more usual ones, where the infection of the sphenoid is found associated with multiple accessory sinus disease, either acute or chronic, are by no means uncommon. Of the unusual cases he recalled a woman of perhaps fifty, who was brought to him because of longstanding, severe, unbearable headaches, which she located in the occiput. She suffered from a dry pharyngitis, but no pronounced nasal symptoms. Both nasal passages were found practically normal, with the exception of the recessus sphenoethmoidalis on the left side, where by inspection one could detect the formation of small crusts. Under cocain the middle turbinate was removed and the anterior wall of the spenoid sinus was broken away. A large amount of thick, almost dry, offensive secretion was removed. The patient made a good recovery and has had no trouble since, after a period of two or three years.

Another unusual case reminded him somewhat of the case of hemorrhage reported by the essayist. This was the case of a man, perhaps about thirty years of age, who had for several years suffered from very severe headache, for which he had consulted a local physician in the country, who had found a slight deflection of the septum and had convinced himself that this was the probable source of the headache. The physician attempted to operate on the septum, but severe bleeding scared him away. Later, because of severe headache, the patient attempted to commit suicide. With a shotgun he blew off his chin. Later he had bone transplanted in the chin, and at that time had the septum of the nose straightened. Ever since the first attempt to operate on the nose the patient had at intervals suffered from very severe nasal hemorrhages. The man was brought to the hospital in a very much weakened condition, and the first glance gave one the impression of a man suffering from the cachexia associated with malignant disease. In examining the nose one could recognize in the region of the recessus sphenoethmoidalis a little pulsating mass, which the speaker diagnosed as a probable malignant growth. There were no eye symptoms. After a few days the patient died, following a hemorrhage. At postmortem an extensive disease was found, involving the sphenoid and posterior ethmoid region. The roof of the sphenoid had been eaten away and the hemorrhages had apparently come from the internal carotid. The condition was one of sarcoma.

Another unusual sphenoid sinus case occurred in a woman of about forty years, whose chief complaint was dryness in the pharynx. The patient presented a typical condition of atrophic rhinitis, with crust formation restricted to an area about the opening of the sphenoid. The shrinking of the middle turbinate was such that one could, without cocain, look directly into the sphenoid sinus. A small amount of pus was coming from this sinus.

Dr. C. M. Robertson said it was hard to distinguish which variations belong especially to the sphenoid and which to the ethmoid sinus. He had observed four cases of a condition which he had not seen described, in which there was bilateral sphenoidal empyema, with bony atresia in the nostrils, which consisted of a solid isthmus of bone between the middle turbinate and the septum. In two cases there was just room over the atresia to pass a probe, and perhaps three or four millimeters of an opening along the floor of the nostril. In the other two the atresia was less in extent.

The first case was diagnosed as a tumor of the brain—the young woman was almost demented. She was in delirium, had hallucinations, and it was feared she would have to be placed in confinement. She had optic neuritis. No papillitis, but there was an optic atrophy in each eye, more pronounced in the right eye, vision being 22/200 in this eye, while in the other it was 20/120 or 20/160—he had forgotten exactly. There was a lack of taste and smell, and she had an angioneurosis in the throat which was very troublesome. One side of the throat would swell up to an enormous size, almost suffocating her, with a bronchial cough and terrific, bursting headache. Dr. Robertson cleaned out both sides of the nose, made her a new nostril, opened up both sphenoids and found purulent material present in both sphenoid cavities as well as postethmoidal cells. This case was rather remarkable, because the atrophy in each eye cleared up, so that the optic nerve became pink, the vessels became normal in size, and the vision came up to 20/20, with a cessation of all of the other symptoms.

The second case was that of a business man who commenced to have spells that were unfitting him for business. He had false epileptic spells. He would feel absolutely normal, and all of a sudden he would go away, and after a few moments waken up and find people looking at him. He had optic nerve irritation—not so marked as in the first case, but enough so that his acuity of vision was down to one-half normal. He had had these spells on an average of one in twenty-eight days for four or five years. He had a heterophoria, which was treated with prisms for eight or ten years. He had had muscle operations and muscle exercises with prisms, so that he was an educated eye subject. When the speaker examined him he found a bony atresia, almost similar to the preceding case After operating upon the nostrils and correcting the atresia, the sphenoids were opened through the maxillary sinuses, which was the shortest route. Finding the maxillary sinus and the posterior ethmoid cells quite hard, he went into the sphenoid, where he found a large accumulation of yellowish, gluey material. From the antrum he went into the sphenoid, and from the nose into the sphenoid, then removing the partition between the two routes. About the second or third time he presented himself postoperative he took away a piece of bone about as large as a thumb nail, and the next time the patient presented, Dr. Robertson saw a tumor mass extending down into the nose that looked the size of a normal middle turbinate, occupying about the position of a normal middle turbinate. The mass was movable, and so the speaker snared it off. It was sent to the laboratory and found to be a pituitary cyst. This man was relieved of his symptoms, and up to the present time has been absolutely well.

The third case was one which he was called in to see in consultation, a man who was unconscious, had a very high temperature, with delirium. His eyes were rolling around so that they could not be examined. However, there was a very peculiar odor noticed. On looking into his mouth, Dr. Robertson saw, against the posterior pharyngeal wall, the nasty, brownish, glairy mucus referred to, and on account of that made a diagnosis of sphenoidal abscess, probably with a brain abscess behind. He was taken to the hospital and operated on the next morning. As the sphenoid was entered a lot of this nasty, sticky fluid came out, and then the curette dropped into the cranial cavity for an inch and a half. All of a sudden there was a gush of blood and chunks of pus. The patient was turned over quickly on his abdomen. In a minute or two the blood stopped and packing was placed quickly. The temperature the next morning was down from 104.5° to 100° or 101°, and the patient was rational. Before this he was absolutely unconscious. The patient died in five or six days. He had a sphenoid abscess that had perforated posteriorly, and had an extradural abscess on the posterior surface of the sphenoid bone. Bony atresia was less extensive than in the former cases.

The fourth case was a similar one to that recited by Dr. McBean, in which the presenting tumor mass was a sarcoma. Those are especially the cases where the discharge is of that peculiar brownish material that is always found in sphenoidal abscesses, even if seen away down by the soft palate, usually associated with necrosis of the bone. They are the worst cases with which we come in contact. This discharge is of the same character as that we get in necrosis of the ear, in those cases where we have nasty, fetid, thin, watery discharges following necrosis.

It seems to him that sphenoid abscess cases are very, very frequent, and it has always struck him that, as the pituitary body lies just above the sphenoid, all these cases of hyperpituitarism must necessarily at first be from an irritation by an inflammatory product in the sphenoid sinus itself. In many cases of hypo- and hyperpituitarism we can bring it right down to the sphenoid cells.

Dr. McBean, in closing, said he was very much interested in what Dr. Robertson had said about the dark brown mucus that he finds. The speaker has never found it in his cases, and hopes he never will, if his cases are going to be as serious as those reported by Dr. Robertson. His own cases have been bad enough, but not like that.

He was also interested in what Dr. Robertson had said about the pituitary disease often being from the sphenoid. In one case he had reported—that of the girl with the unequal pupils—he was sure that her amenorrhea, which continued some months after that, was not due to anything else, but must have been due to the irritation in the sphenoid, and change of circulation in the hypophysis itself. He did not think, however, he could say that all the pituitary cases are due to that, though he is sure this one was.

Dr. Shambaugh's cases also were extremely interesting. He things that most of the dry pharynx cases are due either to disease of the posterior ethmoid or sphenoid.

Paper: The Actinomyces-Like Granules in Tonsils.

Dr. David J. Davis said that the actinomyces-like granules are commonly found in the crypts of the tonsils. They are in no way related to the true actinomyces. These granules always consist of bacilli, cocci and spirilla. The bacilli, which were successfully cultivated, belong to the fusiform bacillus group. They are strict anaerobes. They alone are not pathogenic for animals.

The entire granule, when injected into rabbits and rats, readily produces abscesses.

A symbiotic relationship probably exists between the cocci, spirilla and bacilli.

It is very doubtful whether these granules cause hyperplasia of the epithelium of the crypts. They occur at times in cyst-like spaces in the tonsil lined by compact squamous and hyalinized epithelium.

In the literature these granules have been confused with true actinomyces; misleading statements appear, especially in connection with the subject of actinomycosis of the tonsils.

The writer has not been able to find a well authenticated case of actinomycosis of the tonsils in the literature. It is not meant by this that they do not exist, but if they do they are probably very rare.

These granules are of interest from a practical standpoint, for the following reasons: They are responsible very largely for the odor of masses derived from the crypts, hence are concerned with the condition of foul breaths. They form a nucleus for the deposition of lime salts, thus being responsible often for the formation of tonsil stones. They often plug the crypts, thereby preventing proper drainage. There are always in these granules streptococci, which may be pathogenic and which may possibly play a rôle in chronic streptococcic tonsillitis.

DISCUSSION.

Dr. George E. Shambaugh considered Dr. Davis' work on the pathology of the tonsils very valuable and a contribution of great interest, especially to those working clinically with diseased tonsils. He has always been astonished in reading the reports of the finding of actinomyces in the tonsils that these cases presented no clinical symptoms by which this disease could be recognized. Dr. Davis' work clears up the situation by showing that these are not cases of actinomycosis at all. Dr. Shambaugh does not know as yet just what importance to attach to these cheesy plugs so frequently seen in tonsils. They are composed of different sorts of material, and often are present without apparently causing any symptoms. In other cases they do give rise frequently to distinct symptoms, such as a circumscribed congestion and soreness in the region of such a plug. There is usually a very offensive odor, of which the patient is often conscious. Very often the patient recognizes the development of these plugs because of a general feeling of malaise and headache, which symptoms will clear up immediately after the tonsils have been cleansed. Apparently there is a certain systemic intoxication produced in some of these cases, possibly because the presence of these plugs favors the development of bacteria at the bottom of the crypts. Very often, too, these patients who have trouble with cheesy accumulations in the tonsils suffer from a great many attacks of acute tonsillitis, which are not only a nuisance, but often a serious menace.

Dr. Otto J. Stein was attracted by this subject quite a few years ago, when the question of tuberculosis of the tonsil was so enthusiastically talked about, with invasion of the deeper structure of the neck. He was frequently astonished by the report in these removed tonsils of the finding of these actinomyces-like granules or mycelial-like bodies in apparently not badly diseased tonsils. In fact, they were found in the tonsils removed from children quite frequently, and at first it was thought that some great discovery had been made, some early sign of the disease of actinomycosis. However, in speaking with Professor Zeit, who examined most of these cases for him at that time, he told the speaker that he placed no importance whatever upon them, and that they were very commonly found in the plugs of cheesy material that were found in the crypts of the tonsils. He expressed at that time, and also several times since, the belief that these granules are granule-like bodies that assume this ray-like formation, and meant scarcely anything in the average tonsil removed; that they were commonly found unassociated with any striking local condition around the tonsil or any marked infiltration around the jaw, cheek or neck, and that they might be entirely disregarded. There was another type, however, the true arrangement of the granules, that was associated with this disease, actinomycosis, but in almost all of those cases—in fact, every case—he had found the clinical findings of disease in the neck or tissues surrounding. The speaker had found a case that he believed to be a true case of actinomycosis of the neck, with the ray findings in the tonsil. The case was referred to him as one very like actinomycosis, and he was asked to remove the tonsils. The tonsils themselves did not show anything particular—that is, they did not look very badly diseased, but just like a lot of the chronic tonsils that are removed, but this same arrangement was found. He would not express an opinion as to what relationship this particular finding has to the disease of the neck, but simply mentioned it because the case had recently come under his observation. He is now of the opinion that the arrangement of these granules in the ordinary tonsil, unassociated with any clinical manifestations of the disease itself—actinomycosis—means nothing at all, quite contrary to what Dr. Shambaugh had just expressed.

Dr. C. M. Robertson asked Dr. Davis if he, in his examinations, differentiated between the crypts of the tonsils in which these masses or granules were found, and also if there were any gland involvement in the cases in which they were found, or not.

Dr. J. R. Fletcher asked the members if they remembered when Dr. Grosvenor was here he made an investigation of quite a number of tonsils, and spoke of the relative frequency with which actinomycosis was found in those which he had sectioned. The speaker mentioned this because a year or two ago he removed the tonsils from a Sister of Mercy, who was sent to him supposed to have suffered from tuberculosis of the right lung. Dr. Zeit examined a section of the tonsil and he said it was not tuberculosis, but remarked that he had seen all of the Grosvenor preparations, and this one was the most beautiful case of actinomycosis that he had ever seen. He unqualifiedly pronounced it actinomycosis. This patient has gone on for quite a number of years, and seems to remain in about the same condition, so far as the tuberculosis of the lung is concerned. Dr. Zeit said that probably she had actinomycosis of the lung also. She had no glandular involvement of the neck that the speaker was able to find. He asked for some expression of opinion from the members.

Dr. Stein asked if Dr. Zeit called it a true case, to which Dr. Fletcher answered yes. He had removed the tonsils by request, as they were manifestly diseased, and the attending physician was fearful that the tonsils might have something to do with the disease in the lung, and that she might, perchance, have a better opportunity to recover if the tonsils were removed.

Dr. Otto J. Stein said that Professor Zeit had no doubt found several "most beautiful" cases, because the speaker claimed the distinction of having the "most beautiful" case of actinomycosis, according to Professor Zeit.

Dr. Otis H. Maclay said that it is well to consider the simple things in tonsil cases, which are sometimes overlooked, namely, the odor and the feeling of fullness in the tonsil. These patients often complain of a feeling as though there were a stick in the tonsil, and there is often a cough associated with the condition, where there is nothing much the matter with the patient—no pain or soreness. When the tonsils are cleaned out, the cough, with the other symptoms, disappears.

Dr. George W. Boot asked Dr. Davis regarding the bacilli growing in the form of a brush. Was this not an unusual form of growth for bacilli? Just what did Dr. Davis consider the relation between these organisms and the organisms of Vincent's angina?

Dr. Davis, in closing, answering Dr. Robertson's question, said that in these cases where such granules are found in the tonsils, there is no glandular enlargement. It should be remembered that they are found in practically one-third of all adults. He imagined that if he were to examine the tonsillar crypts of every individual in the room he would find them in about thirty per cent. He has found them repeatedly in his own tonsils, and has commonly found them in the crypts of normal individuals. There is, therefore, little or no reason to suspect that there is any diseased condition when one finds them in tonsils.

With reference to the relation between the bacilli and the filaments, it should be stated that the central stalk is made up of the fusiform bacilli growing in long filaments, just as they often do in artificial culture. A bundle of threads may grow out, and at or near the ends, probably where the conditions of growth are somewhat different, the bacilli there grow somewhat shorter, and arrange themselves perpendicularly to this central stalk.

So far as their relation to the organism of Vincent's angina is concerned, he could not state that they are absolutely identical. However, he had no doubt but that they belong to that group. There are some slight differences between certain strains of this group, so far as their appearance on culture media, reactions, and so forth, are concerned, just as there are differences between various strains of the streptococcus or typhoid groups. The fact that they are always associated with the spirilla is another point in favor of the idea that they belong to the fusiform group; for we know that the organism of Vincent's angina is nearly always associated with spirochetæ that exactly correspond with the spirochetæ found in these granules.

Dr. Davis is particularly interested in the question of the relation—or, rather, nonrelation—of these bodies to actinomycosis. He did not wish to criticize Professor Zeit, or anybody else, so far as this particular point is concerned. If anyone has any definite cases of actinomycosis of the tonsil, these cases should be reported, because there is not a single well authenticated report of such in the literature today. He did not deny that actinomyces might enter into the tissues through the crypts of the tonsils. He rather thought that they might, because the crypts would be a pretty good place for them to grow, and from there penetrate the tissues; but as a matter of fact there is no clear-cut evidence of that at the present time.

Furthermore, if anyone had such a case, he should not be content with simply examining sections of the tonsils. No absolutely reliable statement could be made from such examination. The organisms must be cultured, and the final proof will rest upon the result. Any evidence that is convincing must be of that character.

Paper: Fluoroscopic Bronchoscopy.

Dr. E. Fletcher Ingals and Dr. Stanton A. Friedberg. Three cases of foreign body removed from the bronchi were reported. The first case was that of a nail in a tertiary division of the left trunk bronchus. The second case was a band of gold that was a part of a crown for a tooth, which had lodged in the upper bronchus of the right lung. It had been present for several years; under local anesthesia it was removed with the aid of the fluoroscope. A third case, that of a boy, aged nine years, with a brass bolt present in a cavity of the lower lobe of the left lung for about two and a half years, was also reported. This also was removed under local anesthesia.

A special forcep was used in these cases. It consists of a Krause handle with a simple tube forcep. Its main characteristic is that it is strong and of small diameter, and the grasping surface of the blades is cut like a file, with the cutting edge towards the handle.

Special importance is laid upon the necessity of being sure that the end of the forcep is in the same bronchus as the foreign body. When the forceps has been passed down so that its shadow reaches the shadow of the foreign body, the end of the instrument should be moved back and forth laterally, to determine whether or not it is in the same bronchus or cavity as the foreign body. If it is in a different tube, the shadow of the forceps will pass away from that of the foreign body, but if in the same bronchus, the shadow of the foreign body will move with that of the instrument.

DISCUSSION.

Dr. Otto J. Stein said there was no doubt that the reports of Drs. Ingals and Friedberg showed a distinct advance in the technic of removal of foreign bodies in the esophagus or bronchi. He has had very little experience in this line of work, and could only report two failures. But he believes that the aid of the fluoroscope, if worked out, with proper team work, will eventually lead to the working up of a special technic that will facilitate removal of these foreign bodies. In one case in which he attempted to use the fluoroscope, a very small child of about eighteen or twenty months, a very fat child, the foreign body (a pool check, round with a square hole in the center) was never found or, rather, recovered. It could be seen distinctly with the fluoroscope. An attempt to remove it with the ordinary instruments failed entirely, owing probably to the inflammatory exudates that existed around the foreign body, on account of the manipulation that had been done the day before, continuing for some three hours. By the use of the fluoroscope the foreign body could be seen distinctly, but just at the moment when the speaker tried to use the fluoroscope and instruments together, the child developed a violent convulsion. Temperature was 104.5°, and the convulsion was so violent that he had to desist. A little later the child died.

In another case he attempted to use the fluoroscope, but was again handicapped by very inefficient help. The nurse knew nothing about the work, and there was nobody else at hand. In this case he believed that if he had had the proper help he would have succeeded in getting the foreign body out; but as it was, he failed again.

Dr. Ingals, in closing the discussion on his part, only wished to urge again that the forceps should be moved laterally, and that the operator be sure the foreign body goes with it. If it does not, one is liable to catch the lung tissue. If the foreign body goes with the instrument, it must be in the same tube, and then with care the chances are that the foreign body can be removed. If you have the right kind of a forcep, and get hold of the foreign body, never let go, unless you happen to get hold of the center of a screw, as was the case in one of the cases reported by Dr. Friedberg.

Dr. Friedberg, in closing the discussion, referred to the necessity of an earlier diagnosis in cases of foreign bodies in the lung. It hardly seems reasonable to wait two years to diagnose a metal substance in the lung. In Dr. Ingals' case the foreign body had been in for three years, and in his own case for over two years. The speaker had a somewhat similar case during the past summer, where a tooth had been aspirated and had been present for almost five months, and a small abscess cavity had formed. A picture of the chest revealed the shadow of a tooth. So, in all obscure lung conditions, where the history is indefinite, a fluoroscopic examination should be made. The earlier these cases are discovered, the less changes of a permanent character are found in the lungs, and the chances of a successful operation are increased.

Dr. Stein asked if it was possible to discover an aluminum foreign body by this method.

Dr. Ingals said aluminum would show if it was very heavy, but light aluminum would not show.

Dr. Stein said the reason he asked was because recently he had a case of an aluminum band, two and a half inches long, folded up, that did not show in many X-ray pictures. The fluoroscope was never used, and he was wondering if it would have shown this band.

Dr. Ingals said he had had a case of an aluminum pin in the esophagus. He used the fluoroscope. At first he was satisfied that there was nothing there, but finally he saw the pin.

Dr. Friedberg had seen a case of an aluminum tracheotomy tube jammed down in the bronchus, which did not show.

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XLI.

THE RESULTS OF OPERATION (LARYNGOFISSURE) FOR INTRINSIC CANCER OF THE LARYNX.*

By Professor E. Schmiegelow,

Copenhagen.

Surgical treatment of intralaryngeal cancer gives exceedingly good results, especially when compared with those obtainable by surgical treatment of cancer in other internal organs.

On examining this fact we find it to be due to the peculiar manner in which intrinsic cancer of the larynx originates and develops and spreads, as was originally pointed out by my friend, Sir Felix Semon. It would be interesting historically to consider the development of the pathology, diagnosis and treatment of intrinsic cancer of the larynx, but lack of time forbids me doing so. You must, however, permit me to state here in London, speaking to an assembly of prominent American and English surgeons, that, in my opinion, the whole of our present knowledge of the diagnosis and treatment of this disease is founded on the works of Semon and Butlin, who, towards the end of last century, entirely revolutionized our views with regard to the malignancy of intralaryngeal cancer. Before their day the surgical treatment of this disease had always been regarded as almost hopeless, but Semon showed us that the chief reason of this was that the disease was always diagnosed too late, so that it was too far advanced to give any good operative result.

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*Read before the fifth meeting of the Clinical Congress of Surgeons of North America at London.

Having further learned that intralaryngeal cancer in the great majority of cases appears as a primary cancer of the vocal cord, and therefore soon causes hoarseness, we have means of recognizing the disease at an early stage of its development, while still limited to the vocal cord, making a radical cure possible by removing the diseased vocal cord through a laryngofissure.

To illustrate the frequency of primary cancer of the vocal cord I wish to draw your attention to this table of sixty-six cases of intralaryngeal cancer which have come under my observation:

TABLE A.—PRIMARY SEAT OF INTRALARYNGEAL CANCER.

No specified localization	18 cases
Vocal cord	36 cases
Sinus Morgagni	2 cases
Arytenoid region	4 cases
Epiglottis	1 case
Ventricular band	5 cases
Total	66 cases

In the first eighteen cases the primary seat of the disease could not be localized, as the tumor had extended too far into the larynx when first observed.

The table clearly shows that cancer of the interior of the larynx, in by far the majority of cases, originates as a growth of one vocal cord, generally in the central part of it, and that it can, therefore, be radically removed. If the disease, however, has extended to the anterior commissure, the prognosis becomes more serious, as under these circumstances the thyrotomy cuts through the growth and may possibly be followed by a recurrence.

Those cancers of the larynx which do not primarily attack the vocal cords have, on the contrary, a bad prognosis; firstly, because they very often are not discovered and taken in hand until they have spread so far that there is no possibility of a radical cure by means of a laryngofissure; secondly, because these extracordal cancers are generally of a more soft medullary character, growing quickly and with greater tendency to involvement of the neighboring lymphatic glands.

The only exceptions to this are the pedunculated adenocarcinomas which spring from the arytenoepiglottic folds. Of these I have seen three cases which had a relatively good prognosis and could be treated endolaryngeally with favorable results.

Having made the diagnosis by means of laryngoscopic inspection, supported by microscopic examination of a portion removed through the mouth, one has to remove the growth as soon as possible by means of a laryngofissure.

This operation should be performed as indicated by Butlin and Semon, who about 1890 inaugurated this treatment and proved that this comparatively safe operation was sufficient, if only performed soon enough.

I myself, chiefly following their instructions, have operated in the following manner:

The operation is always performed under general anesthesia. I begin with morphin-ether and make a low tracheotomy. Hahn's tampon cannula is introduced and the narcosis is continued with chloroform. The thyroid cartilage having been divided and the interior of the larynx opened, I fill the pharynx with sterilized gauze introduced from below through the split larynx in order to pevent the saliva from descending and interfering with the scene of action. According to Semon the larynx is packed with gauze soaked in a 10 per cent solution of cocain, to which I add a few drops of a 1 pro mille solution of adrenalin in order to make the mucous membrane of the larynx anesthetic and bloodless. Then the neoplasm, together with the whole diseased vocal cord, is removed by means of knife and scissors.

All the diseased area having been removed and the bleeding stopped, we formerly filled the larynx with a tampon of iodoform gauze, but after Butlin taught us to give up tamponing and to close the thyrotomy wound at once, the results of operation have been much better.

The patients are now able to swallow on the day of operation, and can leave their bed a few days later. This, of course, is of the greatest importance in preventing complications in the lungs, especially in elderly people. My two eldest patients, respectively seventy-one and seventy-four years old, were able to leave their bed on the second day, and they are both alive and well now, at the age of eighty and seventy-six years.

Thyrotomy could only be performed in thirty-three of my cases treated up to 1912, as shown in the following table:

TABLE B.—RESULTS IN SEVENTY CASES OF CANCER OF LARYNX.

	Number of cases	Cured	Died or relapsed
No treatment	10	0	9
Tracheotomy	8	0	8
Endolaryngeal removal	5	1	4
Thyrotomy	33	18	15
Subhyoid pharyngotomy	1	0	1
Partial resection of the larynx	4	0	4
Total resection	9	1	8
Total	70	20	50

The result of these thirty-three thyrotomies was that twenty-eight patients survived the operation, whilst five died from pneumonia, due chiefly to postoperative hemorrhage.

Amongst the twenty-eight patients, recurrence took place in ten cases, whilst eighteen are alive and well. These eighteen had the carcinoma entirely limited to the vocal cord, and the diagnosis was made at an early period of the disease —with only two exceptions. The first of these was a man aged forty-four years (see Table D, No. 11), who had a cancer of the posterior wall of the larynx, and whom I was able to follow for three years after the operation, when I lost sight of him. The second was a man, aged twenty-eight, suffering from an epithelioma of the left ventricular band, anterior commissure and the anterior part of the right ventricular band. This patient I operated on fourteen years ago; since then he has been on an expedition to the North Pole and is still alive and well.

The last four patients were operated in 1912, and have; therefore, only been under observation for about two years since the operation. But they were all cases of quite limited epithelioma of the vocal cord, and were operated so early that there is not much chance of recurrence.

Patient No. 7, a man aged sixty-one years, was operated in 1905 for a cancer of the vocal cord. During the following seven years his larynx remained perfectly healthy, but he now has a quickly growing cancer in the throat requiring tracheotomy. Ought this to be considered as a recurrence or as an accidental cancerous infection of a larynx which has kept perfectly healthy for seven years after operation? Personally I am inclined to look upon it as an accidental reinfection. In all the other cases of recurrence this took place within a year after the thyrotomy.

The functional result was exceedingly good in all cases. The voice was strong, generally sonorous, but in a few cases hoarse. The man aged seventy-one years was operated on in 1905; I saw him last in 1913, he was then seventy-nine years old and had a strong, healthy voice.

A clergyman aged fifty-five years, who was operated in 1896, fulfilled his duties for eight years and preached every Sunday in two churches.

The two men, aged respectively sixty-six and sixty-seven years, who were operated in 1912, are able to make speeches to large assemblies with a comparaively clear voice.

In order to get a broader basis of judgment as to the results of thyrotomy in cases of intrinsic cancer of the larynx, I have combined in the following table my own experiences and those of F. Semon, Chiari and St. Clair Thomson. The results are as follows:

TABLE C.—RESULTS OF OPERATION BY LARYNGOFISSURE.

	Number cases	Cure over 3 years	1 to 3 years	Under 1 year	Recurrence	Death from operation
Semon	24	15	4	1	3	1
Chiari	29	11	4	—	11	3
Schmiegelow	33	11	7	—	10	5
St. Clair Thomson	10	7	2[*]	—	1	0
	96	44	17	1	25	9

It will thus be seen that of ninety-six operated patients, fifty-two (equaling 63½ per cent) were cured for more than one year after the operation.

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[*] (1) Secondary operation of removal of larynx, and now alive five years later. (2) Died from other causes fifteen months after laryngofissure.

TABLE D.—EIGHTEEN CASES OF INTRINSIC CANCER OF THE LARYNX THYROTOMIZED WITHOUT RECURRENCE.

No.	Age	Sex	Date of operat.	Time of observation	Annotations
1	62	Male	1892	18 years	Died in 1910, of cancer of rectum. Larynx free.
2	28	Male	1900	14 years	Alive; no recurrence.
3	50	Male	1904	10 years	Alive; no recurrence.
4	69	Female	1904	10 years	Alive; no recurrence.
5	71	Male	1905	9 years	Alive; no recurrence.
6	55	Male	1896	8 years	Died of cancer of stomach: no recurrence in larynx.
7	61	Male	1905	8 years	Alive.*
8	56	Male	1909	5 years	Alive; no recurrence.
9	47	Male	1905	4 years	Died of tuberculosis in 1909. Larynx free.
10	63	Male	1910	4 years	Alive; no recurrence.
11	44	Male	1896	3 years	Lost sight of.
12	55	Female	1911	3 years	Alive; no recurrence.
13	38	Male	1911	3 years	Alive; no recurrence.
14	66	Male	1911	2½ years	No recurrence; died of some other disease.
15	58	Male	1912	2 years	Alive; no recurrence.
16	67	Male	1912	2 years	Alive; no recurrence.
17	66	Male	1912	2 years	Alive; no recurrence.
18	74	Male	1912	2 years	Alive; no recurrence.

*Seven years after the operation cancer recurred in the larynx; probably new infection.

XLII.

TUBERCULOSIS OF THE MIDDLE EAR.*

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The frequency of middle ear involvement in tubercular individuals, especially in subjects of phthisis pulmonalis and in those of tubercular dyscrasia, was noted as early as the middle of the last century (Toynbee,[1] Von Troltsch,[2]). Wilde[3] was familiar with the clinical picture presented by the painless onset, the discharge and peculiar appearance of the tympanic membrane in tubercular otitis media thirty years before Koch discovered the causative organism in 1882. In 1883 Eschle[4] succeeded in finding the tubercle bacillus in middle ear discharge, and Habermann[5] was the first to demonstrate giant cells and tubercle bacilli in the tympanic mucous membrane. Virchow, Toynbee, Zaufal and others contributed to the literature, and Politzer[6] in 1865 defined the clinical peculiarities of tubercular ear disease. Schwartze[7] in 1878 described the cheesy infiltration and tubercles of the mucous membrane, but not until 1882 was a definite histologic examination of middle ear tuberculosis made and described by Politzer,[8] who has since collected many specimens demonstrating the destructive nature of the disease. It has been mostly in the last decade and a half, however, that tuberculous disease of the ear has gained its deserved importance and the literature on the subject accumulated.

FREQUENCY.

Brieger[9] asserts that of those suffering from tuberculosis elsewhere in the body, about twenty-five per cent were affected by middle ear tuberculosis. Westmacotte[10] found two per cent of fifteen hundred school children in Manchester, England, suffering from tuberculosis of the middle ear. The disease is probably of far greater frequency than our statistics show, and the true diagnosis is often mistaken because its onset is so insidious that attention is not early called to the condition and no observation is made. Moreover, when the case presents itself the condition usually has passed from that of a pure tuberculous process and become a mixed infection, the symptoms of the suppurative condition masking the true nature of the initial disease. The careless manner of classifying all discharging ears as suppurative otitis media without recourse to the microscope or inoculation tests is unfortunate.

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SYSTEMIC INFECTION.

The one essential factor for the development of tuberculosis is, of course, the tubercle bacillus, but there are many other etiologic elements that deserve brief mention. Heredity, for so long regarded as playing such an important rôle in the production of the disease, has been relegated to the background. Inherited tuberculosis does occur, but is extremely rare, and Ravenel says that there are but twenty-five well authenticated cases in the literature. That which may be inherited is a susceptibility and predisposition to infection by the tubercle bacillus, which being ubiquitous is most apt to gain a foothold.

MODE OF ENTRY.

Owing to the great frequency of pulmonary tuberculosis, it was long believed that the bacilli were simply inhaled with the inspired air and promptly found lodgment in the lungs. But facts, both clinical and experimental, are constantly accumulating, which prove that the digestive tract is an important, if not the most important, avenue of entry for the tubercle bacilli.

The tonsils may often be a portal of entry for the organism; whence, owing to the rich lymphatic supply, infection may spread to the bronchial and mediastinal glands, and thence to the lungs. A point which complicates the understanding of the portal of entry of the tubercle bacillus is that the location of the primary lesion, on which so much stress has been laid, does not indicate with certainty the point of entrance of the invading organism.

The figures of Harbitz are as instructive as any to be found. In his report, based on one hundred and seventeen cases, he found:

	No. of Cases	Per Cent.
Primary involvement in respiratory tract	48	41
Primary involvement in digestive tract	26	22
Primary involvement in digestive or respiratory tract	24	20.5
General lymph node tuberculosis	11	9.4
Doubtful or other primary seat	8	6.8

Again, it must be emphasized that the location of the lesion does not indicate the portal of entry, and especially is this true in intestinal infection, as it has been shown by many that the mucous membranes of the various parts of the body can be penetrated by the tubercle bacillus without previous injury and without demonstrable lesion.

Calmette, from his studies, concludes that pulmonary tuberculosis, acquired at any age, may be due to recent intestinal infection. Schlossman and Engel have shown that when tubercle bacilli in milk or cream are injected into the stomachs of young guinea pigs through an incision in the abdominal wall, they reach the lung in a few hours, as proven by killing the animal and inoculating others with portions of the lung. Cases of human infection with bovine bacilli can be assumed to be of intestinal origin, as the chances for inhalation of bovine bacilli by human beings are extremely slight.

The results of work done with the object of establishing inhalation infection experimentally, such as causing dogs and guinea pigs to breathe air saturated with dried sputum containing tubercle bacilli, are open to the very grave objection that no attempt was made to close the esophagus, and it is certain that some of the bacillus-laden dust was swallowed. However, Findel, working with Fluegge, has infected dogs and a calf by blowing a spray of bovine bacilli into the trachea, which had previously been opened. At autopsy tuberculosis of the lungs was found, while the tonsils, cervical, retropharyngeal and mesenteric glands were free from the disease, both macro- and microscopically. In addition, Nenninger has shown that when rabbits are forced to breathe air laden with the bacillus prodigiosus, cultures can be recovered from the finest bronchi. With these experimental facts at hand, the occurrence of inhalation infection cannot be gainsaid.

In general, then, it may be said that infection through the alimentary tract unquestionably occurs in a large proportion of cases. In children, especially, it occupies a position almost, if not quite, as important as respiratory infection. It must be understood, however, that the source of intestinal infection is not always food—dust, reaching the upper air passages, is often swallowed in the saliva and nasal secretion. The frequency, however, with which bovine tubercle bacilli have been found in children, show that their food is often responsible for the infection.*

The middle ear must be regarded as belonging anatomically and bacteriologically to the upper respiratory tract, as insisted upon by Goldstein,[11] who considers primary tuberculous infection of the middle ear of respiratory rather than of alimentary origin.

Quoting from Schenorl: "At the present time the general opinion seems to be that while the hematogenous and lymphogenous origin of instances of nonmiliary pulmonary tuberculosis cannot be denied, the disease, in the large majority of cases, originates from a primary, air-borne infection of the lungs."

ETIOLOGY.

Underlying conditions which act as predisposing factors to tuberculous infection exert an influence, remote or immediate, and acquire increased importance in the presence of the essential cause. Among the predisposing factors may be classed general debilitating diseases, the hereditary influence of tuberculosis, syphilis, association with tuberculous individuals, unhygienic environment, overcrowding, poor food, cachexiæ; in short, any condition of surroundings or constitution which induces a lowering of the systemic power to combat infection.

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*The above taken largely from Ravenel, in Klebs' "Tuberculosis," pages 13 to 45.

Among predisposing causes of more immediate influence may be regarded:

First: Existence of a tuberculous lesion elsewhere in the body, especially pulmonary phthisis with cavitation, and tuberculous disease of the glandular and osseous systems; the former in adults, the latter in infants and children. It is noteworthy, in this connection, that tuberculous ear disease of adults where phthisis with cavity formation is present is usually primary in the middle ear; and in children, in whom gland and bone lesions predominate, primary involvement of the mastoid with secondary progress to middle ear is frequent. The emaciation and debility attendant upon advanced phthisis, and the recumbent position of the patient, all contribute to the difficulty of free removal of sputum from the eustachian vicinity and facilitate passage of minute particles into the eustachian canal. Ostmann[12] believes that the loss of fat around the lumen of the eustachian tube causes such an increase of its diameter that transmission of infection is rendered easy. Virchow considers tuberculous caries of temporal bone as secondary to tuberculosis elsewhere in the body.

Second: Abnormal conditions of the upper respiratory tract, including presence of nasopharyngeal adenoid growths, which have been shown by microscopic examination and inoculation tests to be the frequent seat of a latent tuberculosis. Of adenoids removed from otherwise healthy children the following were found showing evidence of latent tuberculosis: Dieulafoy,[13] 20 per cent of thirty-five cases; Gottstein,[14] 12 per cent of thirty-three cases; Brindle,[15] 12 per cent of eight cases; Milligan,[16] sixteen per cent of his cases. Inoculation tests gave the highest percentage of infection.

Nasal obstructions which interfere with the drainage and ventilation of the nasal fossæ and nasopharynx indirectly offer a predisposition.

Third: Infancy and childhood offer a predisposition for several reasons. Anatomic conditions and relations favor eustachian infection. The exanthemata and other infectious diseases are oftenest encountered in childhood. The frequency of adenoids and acute or chronic inflammation of other lymphoid structures in the throat, and the greater susceptibility and relatively less resistance of childhood to infection, are all conditions favorable to infection should the opportunity occur. The embryonal character of the mucosa of the infant's eustachian tube and tympanum has been advanced as a cause for the easy establishment of a tuberculous lesion in the middle ear. The temporal bone of the child is soft and contains red marrow, which is not the case in the adult bone.

CHANNELS OF INFECTION.

The pathologic changes in the middle ear and temporal bone are directly excited by the presence of tubercle bacilli, which may be conveyed to the middle ear or its adnexa through the following channels:

1. Mechanically, through the eustachian tube; either air-borne or introduced into the tympanic cavity by aid of particles of mucus or foreign matter during acts of swallowing, coughing, sneezing or blowing the nose.
2. Infection along the eustachian tube by other than mechanical means.
3. Through the blood channels.
4. Through the lymphatics.
5. Via the external auditory canal.
6. By extension of an intracranial infection through the internal auditory canal, fallopian canal or the labyrinth. This is mentioned merely as a possibility.

Mechanical conveyance of bacilli to the middle ear is not so improbable as superficial consideration might indicate. A review of certain facts in the anatomy of the tubæ auditivæ leads to an appreciation of the facility of this mode of invasion. In adults the eustachian tubes are from thirty-three to thirty-six millimeters in length, and converge downward, making an angle of thirty to forty degrees with the horizontal plane. The downward inclination occurs only in the cartilaginous portion of the tube. The height of the lumen of the tube at its pharyngeal orifice is nine millimeters, its width five millimeters, while at the tympanic end corresponding measurements are five and three millimeters.[17] In infants the tube is much shorter, being less than twenty millimeters, and its lumen comparatively, and, as stated by Eitelberg, actually, greater in children than in adults. In children, too, the tympanic orifice is larger and on a lower level, and the pharyngeal opening much nearer to the choanæ and more in line with the respiratory air currents than in the adult. The ciliated lining of the eustachian tube tends to remove any extraneous material deposited upon it, but a forcible blast of air in a contrary direction may easily transfer the particle to the tympanic cavity. Milligan[18] has suggested that movements of sucking, initiating to and fro currents of air along the eustachian tubes, favor transmission of infection. He[19] also suggests the possibility of infection from regurgitated curds of tuberculous milk depositing bacilli in the pharynx, tonsil crypts and eustachian orifices. The mechanical mode of infection appears probable in late phthisis, when the emaciation of the tissues causes the tubes to approach the infantile type, becoming wider in lumen.

J. Horne[20] has shown that aural tuberculosis is a more frequent complication of phthisis with cavity formation than of any other type. The frequent cough, abundant bacilli-laden sputum, together with the altered tubal conditions, are favorable to the mechanical theory of infection. The fact that water entering the nasal chambers in swimming or diving, or during the use of the nasal douche, may find entrance to the middle ear, is familiar to all, and that bacilli in the upper respiratory tract may likewise gain entrance, is highly probable. That politzerization and catheterization carry mucus along the eustachian canal and often into the tympanum is demonstrated by the diagnostic tube. Snuff and smoke have been blown experimentally into the mastoid antrum.[21] Habermann, Barnich, Cornet and Spira have observed instances of infection through the eustachian tubes.

To me the mechanical theory of infection, especially secondary, seems simplest, easiest and most probable in the great majority of cases; and it is suggested that the greatest number of cases occur in early childhood and advanced phthisis, when the conditions favorable to the mechanical passage of infectious material through the eustachian tube are at their maximum.

Not only may the eustachian tube transmit infection without becoming infected, but its lining mucous membrane may permit passage of bacilli into the lymphatic plexuses and subepithelial collections of lymphoid tissue around the lumen of the eustachian tube, without producing any lesion at the site of inoculation. After reaching the submucosa they may produce caseous lesion of the lymph gland, and later be carried to the middle ear, or reach the tympanum directly through the lymphatic vessels, or be carried in by leucocytes. Politzer favors the view that infection reaches the middle ear through the tubal submucosa, and Goldstein states that "over seventy per cent of the inflammatory and infectious processes which involve the ear have their origin in the pharyngeal and nasopharyngeal cavity."

Although the eustachian tube is a very infrequent localization of tuberculosis, the infection may reach the middle ear by extension of pharyngeal or nasal lupus by direct continuity.

Infection through blood channels from a focus more or less distant may localize itself primarily in cancellous spaces of the temporal bone, and invade the middle ear by extension of the process of infiltration and disintegration. Or infection may come from a preexistent, perhaps quiescent, lesion in bone or gland, or from ingested bacilli introduced into the circulation through the thoracic duct. Many observers regard the hematogenous the most frequent mode of infection in childhood. Henrici[22] reports eight cases of tuberculosis of mastoid bone in children with no pulmonary lesion, and considers them to be of hematogenous origin. One case showed slight tuberculous infection of tonsils. He regards the blood path infection as the rule in childhood, and believes the primary involvement to be in the bone. Cases of hematogenous origin have been reported by Knapp,[23] Wilde,[24] and Hurd.[25] Barnich has shown that this method occurs when the distal infection is in the osseous or glandular system.

Lymphatic infection in this locality can occur only in a direction contrary to the lymph current. Such extension occurs elsewhere and is equally possible in this situation. The lymphatic drainage of this area has not been well worked out. Poirier and Cuneo[27] state that the lymphatics of the cavum tympani empty into the retropharyngeal glands, which also receive drainage from the eustachian tubes. These glands also receive afferents from the upper part of the pharynx and the nasal fossæ. Efferent lymphatics run to the superior cervical glands along the internal jugular vein, draining regions peculiarly open to bacterial invasion, and offer a possible avenue of entry for aural infection.

Tuberculous infection through the external auditory canal is infrequent. Bacilli may gain entrance through a perforated membrane or through the tegumentary lining of the canal through an abrasion or without discoverable lesion. Lupus may involve the middle ear by a direct extension.

An intracranial origin of middle ear tuberculosis is improbable, and must be of extremely rare occurrence.

Spira recognizes a congenital origin of the disease.[28]

PATHOLOGY.

Clinically two rather distinct forms of middle ear tuberculosis manifest themselves: the acute and the chronic. In each may be found all the changes from slight infiltration of the mucous membrane to extensive necrosis of the temporal bone. Rapid loss of tissue is characteristic of the acute form, resulting from ulceration of the tubercles throughout the mucosa. Habermann, Winkler and Brieger think that tuberculosis begins in the mucous membrane of the tympanum, especially on the promontory; Kuesta, in the antrum, while Bernstein holds that the membrana tympani is the site of the first lesion. In the membrana tympani the tubercles are first confined to the intima, and may be seen through the transparent membrane after undergoing caseation.[16] The membrana propria, being more resistant to invasion, is not attacked until the intima is mostly destroyed. Its destruction is said to be due to a process of erosion rather than that of tubercle formation and caseation. Grimmer[29] found absorption or softening of the intima at isolated points through which the invasion extended to the dermal layer, thus accounting for the existence of multiple perforations.[30] S. Moss[30] found no true inflammation in the membrana propria. In the acute form a grayish or yellowish gray point may occasionally be found in the inferior or posterosuperior quadrant, marking the site of first perforation. The membrane is of reddish hue, due to hyperemia, which gives way in parts about the umbo and below to an opaque nonvascular appearance, while the parts near the periphery throughout may show a raised or distended and rounded appearance of yellowish gray color, as if thickened by a greater infiltration than the central part. The greatest hyperemia is seen in the three-quarter arc anterior, superior and posterior, between the central white areas near the umbo and the outer circle above described. After perforation mixed infection causes modification of the condition, and rapid destruction of both soft parts and bone ensues.

In the chronic form the process runs an asthenic course, and infiltration, caseation and necrosis follow less rapidly and with more characteristic tuberculous sequence. Granulations are flabby, pale and anemic as compared with the vascular, reddish granulations of pyogenic infection. They may fill the cavum and protrude through a perforated membrana, or the external auditory canal may be occluded by them. The mastoid cells may be replaced with a mass of such granulation in which Milligan[31] found giant cell formation, caseation and other characteristic tuberculous changes. In the chronic form, circumscribed miliary tubercles develop on the superficial membrane of the tympanum and undergo caseation and ulceration, with giant cell formation. Politzer and Brieger found destruction of mucous membrane of cavum exposing bare bone. Hartmann considers the typical place of first perforation the lower half of the membrana tympani; Buck,[32] the upper posterior quadrant. Grimmer[29] found that advanced tuberculous changes may take place in the mucous membrane of the tympanum, or in the tympanic membrane itself, without producing visible evidence through the external auditory meatus.

Marked resistance is shown to the process of necrosis by the periosteum and dura, and often extensive destruction of bone is limited by these structures in seemingly normal state. The sheath of the facial nerve, as demonstrated by one of my cases (case 1), resisted the invasion of a very extensive necrosis. The fallopian canal, also, on account of its density and perhaps its abundant blood supply, offers marked resistance to invasion. The frequency of facial paralysis in children may be due to the bone being softer than in adults, and to its incomplete ossification.

The ossicular chain is early attacked, and may be found in any stage of necrosis. Haike[33] mentions caries of the footplate as being often present. Perforation of the fenestra ovale follows the destruction of the footplate, and with a similar condition in the fenestra rotunda the infection gains access to the labyrinth, causing marked deafness and vertigo. According to Milligan, perforation of the fenestræ occurs in one-third of all cases.

Caries may attack the blood vessels, resulting in hemorrhage and thrombosis, as reported by Koessel. The petrosquamosal sinus is supposed to offer an avenue of infection from the middle ear, Cheatle[34] reporting a case of miliary tuberculosis originating in this way.

Brieger says spread of the disease to the brain is not common, except in children, owing to fibrous tissue formation closing the lymph spaces.

Mastoiditis is a frequent complication. The mastoid process is often the site of a primary lesion.

Jobson Horne[35] believes that early glandular enlargement results from primary tuberculous middle ear disease, and is seldom found in secondary involvement. This has been the case in the author's experience. Why this should be true is not apparent. In a primary infection the proximal glands must constitute the line of defense between the focal infection and the rest of the body, and this duty is constantly performed. If the aural condition is secondary to a pulmonary or general tuberculosis, a systemic infection has already ensued, and there is no area of demarkation and consequently no line of defense. The mastoid and preauricular glands are first enlarged, and later the retropharyngeal and deep cervical. It has been demonstrated by Poirier and Cuneo[27] that the retropharyngeal glands receive afferent lymphatics from the middle ear and also from the pharynx, and since infection has been known to travel against the lymph stream, it is possible that the retropharyngeal gland infected from a diseased pharynx may in turn convey infection to the middle ear. Conversely, it has been suggested that retropharyngeal abscesses may have resulted from tuberculosis of the ear.

Intracranial complications in tuberculosis of the ear are rare, compared to that of pyogenic otitis (Politzer, Jobson Horne). According to Mathews,[36] it is not infrequent. Macewen[37] reports ten cases of meningitis of tuberculous origin, five of which had intact membrana tympani, the internal auditory meatus being the avenue of infection in five of the cases. He reports one case resulting in miliary tuberculosis from infection through the lateral sinus. Intracranial abscess seldom complicates this disease, but may occur as the result of mixed infection gaining entrance through necrosed areas at tegmen tympani, about lateral sinus, or even through the internal auditory canal (Mathews[36]). The necrosis may extend outward, causing Bezold's perforation and a subperiosteal abscess about the mastoid tip, or a gravitating abscess into the neck. Fistulous tracts near the mastoid may lead through the skin directly into a careonecrotic mass pervading the whole mastoid and labyrinth.

In primary cases, especially in children, the infection may pass through the eustachian tube and into the alimentary canal and cause a tuberculous enteritis.

SYMPTOMS.

In determining whether an otitis is tuberculous or not, we must first consider whether the patient shows symptoms in general of tuberculous disease; loss of weight and pyrexia being the most characteristic. In a primary tubercular otitis, emaciation would not be expected early, not until dissemination supervenes; but in secondary involvement the system is already toxic, and tissue waste in the majority of cases is considerable. Diarrhea often complicates the case and adds its quota to the wasting disease. Extreme dryness of the skin and an occasional rash may also occur.

In primary cases, and before pyogenic microorganisms are superimposed, the temperature may, on account of the asthenic condition, remain low, being atypical of the pyrexia characteristic of a systemic tuberculous condition.

But if the chart be watched carefully the simulation of the typical swaying temperature will sooner or later manifest itself. Mixed infection may at any stage of the disease modify the expected rhythm and immediately cause a pyrexia not at all unlike that of a fulminating otitis of pyogenic origin. The distinction between the acute and chronic forms of the disease is probably a matter of associated pyogenic infection in the former. In my opinion every uncomplicated case, either primary or secondary (unless of miliary type), would present symptoms of the chronic type. In each type absence of pain is the essential symptom differentiating it from otitis of other genesis. Even though the destructive process is rapid and the appearance of the membrana per se simulates an acute purulent otitis, there is seldom any complaint of pain. In case 5, where in four days the lower half of the membrane was destroyed, there was entire absence of pain. As long as the condition remains characteristically tuberculous and the ravages of pyogenic microorganisms are absent, the process is painless. Pritchard suggested that the early perforation of the membrana tympani relieving the tension of the cavum accounted for the lack of pain, but, as shown by Macewen's[37] cases, five resulted in intracranial complication without rupture of the membrana, and no doubt had a painless beginning. It is also to be remembered that the membrane does not perforate early. It has been suggested that in the breaking up of the bacilli into wax and alcohol, the alcohol liberated into the tissues produces an anesthetic effect. We do know that tuberculous lesions in general are fortunately painless, and tuberculous otitis is no exception.

In the acute form a view of the membrana tympani shows, at first, little to differentiate the condition from a myringitis of nontubercular etiology. There are, however, usually two points characteristic. Seldom is the hyperemia uniform over the membrane, nor is it confined along the manubrium and Schrapnell's membrane, as is often observed in the other otites, but, on the contrary, there exist clearly circumscribed areas of paleness and opaqueness, whose location is at variance from what would be expected from the anatomic distribution of the blood vessels. This pale area is most often found in the lower part of the membrane, including the tip and lower third of the manubrium, and extends near but not quite to the periphery. Accordingly, a second small area (and at times the only area) is immediately posterior to the short process. These areas remain pale, become thicker, as does the membrane throughout, and are invariably the points of first perforation, the destructive process being limited at first closely to the margins of what constituted the pale area. In no other condition have I found this marked contrast and, to me, typical appearance of the tympanic membrane. These areas appear flatter than the hyperemic adjacent parts, which latter are seemingly distended, as is a membrana in acute purulent otitis with pressure. The other characteristic condition, always present, which can be perceived, is the thickening; and the amount of thickening is in direct proportion to the acuteness of the condition in acute and to the duration in chronic cases. In case 5 a large perforation occurred, corresponding to the previous pale area, during an act of sneezing, when a hissing noise in the ear was accompanied with a slight aural discharge.

There is nothing characteristic of the discharge, save the presence of the tubercle bacillus, occasionally found; and some observers believe that their presence does not in itself absolutely prove the existence of the disease. At first watery and inoffensive, occasionally blood stained, the discharge soon becomes thick or thin, copious or scant and offensive, according to the progress of the disease, whether a pyogenic infection intervenes, and whether a careonecrotic process is present. Spicules of bone (as in case 1), sequestra and ossicles may be found in the discharge.

Granulations may appear at the point of perforation in chronic cases, and remain there, flabby and pale, blocking the exit of the discharge. They may even fill the tympanum or protrude through a large perforation, partly or completely filling the external auditory canal (as in cases 1 and 2). Microscopic examination of these granulations may reveal tubercle, giant and epitheloid cells, caseation and tubercle bacilli (Milligan).

Carious areas may be felt on the inner tympanic wall or in the ossicles early in the disease. It is believed by some that the process begins in the bone, that tuberculosis of the ear is essentially a bone tuberculosis, and usually a part of a general condition. Often a probe can be passed backward through a perforation of the posterior canal wall into the mastoid. In case 1 a fistulous opening in the posterior canal wall in each ear led into the mastoid, which was filled with granulation. No resistance may be felt as the probe enters the soft caseous mass replacing the labyrinth, or the pars mastoidea and labyrinth may form one or more large sequestræ. Fistulous opening near the mastoid tip may occur in chronic cases.

Facial paralysis is frequently observed in primary cases and in children, and less frequently in secondary involvement and in adults. It may be suddenly complete, but usually is partial at first, affecting areas supplied by certain fibers.

DIAGNOSIS.

In determining the diagnosis, the family history should be carefully considered with regard to tuberculosis, and the patient's habits, residence and environment should be ascertained to determine whether he has been unduly exposed to tuberculous persons, or unhygienic surroundings. Case 2 lived with parents, both of whom were tuberculous, and since dead of the disease. Case 3 had a tuberculous mother, since dead of pulmonary tuberculosis. The matter of environment plays an important part, especially in children. In the adult the personal history is, perhaps, of equal importance, and whether the subject had, at this time, or has had (now latent) pulmonary or other tuberculous lesions. Cases 4 and 5 had phthisis pulmonalis in active state. Much coughing predisposes to the affection by mechanically infecting the pharynx and eustachian tube with sputum. The absence of pain, as noted in the symptomatology, the loss of hearing, sometimes complete, and the rapid invasion of the disease, are pathognomonic of otitic tuberculosis. It is stated that sarcoma of the ear is also painless.

Facial paralysis, especially in children, occurs in one-third of the cases, against one to two per cent in non-tubercular conditions. It is of special diagnostic significance.

While the copiousness of the discharge may not differ from that of other suppurative conditions, its sanious and foul condition excites suspicion, and especially when particles of bone (as in case 1) are incorporated. Gaudin attaches importance to the character of the granulations.

Marked impairment of hearing, absence of headache and occurrence of hemorrhage are diagnostic points mentioned by Horne. Politizer[38] emphasizes the rapid destruction of the membrane and early caries, while Haike[39] attaches much importance to necrosis of the footplate of the stapes.

Brieger[40] considers tuberculin injections as a valuable aid to diagnosis, especially in chronic cases. In one of his cases the reactive swelling was so great as to cause facial paralysis, the previously pale tympanic mucosa became infiltrated, and the previously negative examination of discharge showed numerous tubercle bacilli.

Recent investigations of the blood pressure in tuberculosis tend to show that a condition of hypotension exists continuously in the pretubercular state (Faught[41]).

The only positive means of diagnosis are:

1. Finding microscopically in the discharge or granulation the tubercle bacillus; or
2. Giant and epitheloid cells and caseation in the tissue.
3. By experimental inoculation reproducing tuberculosis.

The bacillus tuberculosis can be found in about fifty per cent of the cases. It is difficult to find after pyogenic bacteria gain access and increased putrefactive changes have occurred. Gruber, Politzer and Bernstein do not consider presence of tubercle bacilli in aural discharge as absolute proof of tuberculous infection, while Gottstein, Koenig and Marschand think that failure to find tubercle bacilli is of little diagnostic importance. Siebenmann and Milligan use inoculation tests in diagnosis, while Brieger considers microscopic examination of tissues reliable. We should not forget that nontuberculous infection may, and often does, occur in subjects suffering from pulmonary or other tuberculous lesions. Every suspected case should be examined, however, in order that, in primary cases especially, an early diagnosis may be made, and appropriate treatment, hygienic, therapeutic or surgical, be instituted.

Much has been written concerning the differentiation between the tubercle and other acid-fast bacilli which simulate it. It is true that the average observer cannot with the means usually at hand in his laboratory make the distinction. The bacillus smegmæ, bacillus subtilis, bacillus butyricus are among these, but their occurrence is so unlikely that they are negligible; at any rate, it is safe to consider any case showing an acid-fast bacillus as true tuberculosis, and treat accordingly until the contrary is proven.

PROGNOSIS.

The prognosis of middle ear tuberculosis is, as a rule, unfavorable. It is so because usually it is a complication of a general tuberculosis, the prognosis of which is unfavorable; or it is a primary process in an infant illy nourished, marasmic, syphilitic or tuberculous, which conditions themselves, without an otitic focus, may threaten the child's life. The middle ear process, per se, is not so unfavorable as has been pictured, unless advanced or miliary tuberculosis of lungs or other organs militate against the repair of the secondary complication. Crockett[12] considers the prognosis of tuberculous otitis in infants as favorable as of ordinary septic infections. The prognosis is unfavorable in acute cases, especially in advanced pulmonary tuberculosis, and as a rule marks the beginning of the end. It is unfavorable if the symptoms of labyrinthine involvement or facial paralysis are present. It is favorable when arising in cases of chronic pulmonary tuberculosis, and especially when of a chronic type. In such cases the condition of the ear is as a barometer, indicating by its exacerbations the activity in the lung or other affected organ. The otitic condition will, as a rule, improve or not as the general condition improves or grows worse; and this suggests that in chronic cases the treatment is essentially that of the general condition—hygienic, dietetic, medical and surgical, as the case indicates.

TREATMENT.

The treatment naturally divides itself as above enumerated. For the lack of space the hygienic and dietetic, although of vast importance, will not be considered; nor will the internal treatment, except the use of tuberculin, be given.

USE OF TUBERCULIN.

The use of tuberculin has proven so successful in so many forms of tuberculosis that no tuberculous process in any way localized can be considered invariably to contraindicate its use.

The question of tuberculin therapy is such a broad one that its mention here must be confined practically to generalities. The choice of the particular member of the tuberculin family (now numbering about seventy varieties) is of less importance than familiarity on the part of the administrator with the product he is using. Theoretically, Bacillen emulsion (B. E.) should confer a greater amount of antitoxic immunity, and old tuberculin (O. T.) and bouillon filtrate (B. F.) a greater amount of antibacterial immunity (Ringer[43]). Practically the same end result can be reached with any of these products of the tubercle bacillus. The object in giving tuberculin is, of course, the stimulation of the natural specific resisting forces of the body toward the production of an active type of immunity to the tubercle bacillus and its toxins.

As to the advisability of using tuberculin in tuberculous middle ear disease, so great an authority as Politzer dismisses the matter with the curt sentence: "Injections of tuberculin have proven worthless." The writer can see no reason why it should not be indicated and of decided value in properly selected cases. It should, of course, not be used in acute fulminating cases, for here the body is already overburdened with toxins, and the reactive forces are exhausted beyond the power of stimulation by tuberculin. We know, however, that the tuberculous process is practically the same wherever situated; we have all seen brilliant results obtained by the use of tuberculin in tuberculous laryngitis, lupus, testicular tuberculosis, tuberculous adenitis and bone and joint tuberculosis, to say nothing of the vast army of pulmonary cases whose lives have been prolonged and health restored, partly by the aid of tuberculin. With these indisputable facts before us, why exclude tuberculosis of the middle ear from the category of those affections that tuberculin can and does aid?

One of the great obstacles to our gaining a knowledge of the beneficial effects of tuberculin in tuberculous otitis media lies in the fact that as a primary condition it is relatively rare, so that we are usually face to face with a tuberculous process antedating the middle ear involvement. Furthermore, this tuberculous process may be of such a nature or in such a stage as to contraindicate the use of tuberculin. The fundamental proposition, however, holds true, that tuberculin, if it be of aid in any given case, is of aid in the most rational and satisfactory manner, by striking specifically at the cause of the trouble, and by producing the most lasting results in stimulating and enhancing the natural immunizing forces of the organism.

Practically no details as to dosage and method of administration can be given in an article of this scope, for almost every physician experienced in the use of tuberculin (and the remedy is not one to be used freely by the inexperienced) has his own preference for the particular product used, the frequency of dosage and the scale of increase. As stated above, the particular tuberculin employed is of no great importance. What is, in the writer's opinion, the most important element in tuberculin therapy, is the correlation of the size of the dose and the tolerance of the patient. These two elements can never be dissociated, and their interdependence disposes at once of any attempt to give tuberculin by rule of thumb. Any tyro can diagnose a violent systemic tuberculin reaction with its chill, fever, malaise, and increase in all preexisting symptoms, to say nothing of the appearance of new ones; but any tyro is not qualified to administer tuberculin. Local reactions at the site of injection are easy to diagnose—the brawny redness and more or less extensive infiltration being pathognomonic objective signs, while the pain, discomfort and complaints of the patient are insistent and convincing subjective incidents. Both of the preceding types of reactions are, however, easier to diagnose, of less frequent occurrence, and also of lesser importance than the focal reaction, which is a clinical expression of the specific action of tuberculin upon the focus of disease. The focal reaction should be the more carefully studied and the more familiar to the physician in those lesions of tuberculosis that offer themselves to direct inspection, such as lupus, the larynx, and the ear. Slight changes in local appearances, a slight swelling, increased congestion, whether or not united to subjective local sensations (increased pain or deafness), or objective symptoms (increased discharge), should warn the administrator of tuberculin that he is nearing the limit of his patient's tolerance. This limit it is most desirable to reach, but most dangerous to overstep, for it is in the overstepping that harm—sometimes temporary, sometimes irreparable—may be done. It should ever be borne in mind that the size of the dose divorced from the tolerance of the patient is of absolutely no value, and that apparently minimal doses in patients highly sensitive to tuberculin are of just as much therapeutic benefit as are massive doses in other patients possessing relative tuberculin insusceptibility. Haste has no place in tuberculin therapy, and to haste—to the desire to "get to big doses"—is ascribable much of the odium that has been vented upon this important remedial agent.

The duration of tuberculin treatment is as yet a knotty and unsettled point. It is the general consensus of opinion that no course of tuberculin will prove of lasting benefit that does not extend over several months. There are, for the various preparations, arbitrary maximal doses which should not be surpassed. Very few patients, however, ever reach these doses. In health resorts the patient's departure for home too often determines prematurely the cessation of tuberculin. Where time plays no part, one should be guided by the condition of the local lesion and the tolerance of the patient. If the local condition be satisfactory, and the patient exhibits signs of intolerance to a given dose, it is well to drop slightly down the scale and to repeat the amount decided upon several times. If upon increase intolerance is again evident, a cessation of tuberculin for a few months is desirable. Supplementary courses of tuberculin are to be counseled, even in the absence of any recrudescence of the disease, as a prophylactic measure. Such courses should be given not more frequently than every six months, and not more infrequently than every eight months. They can be gone through with more rapidity than the initial course, as the previous tolerance of the patient is already known, and they serve to preserve and to heighten the degree of immunity to tuberculosis.

SURGICAL.

The membrana tympani in any case of tuberculosis of the middle ear should be incised early. This should not be delayed until perforation occurs (as in case 5, in which the lower half of the membrane sloughed away during a night). The incision should be through the portion showing the greatest infiltration, usually the pale, opaque area found below or posteriorly. It should be done for the sake of drainage of the middle ear, for the relief of the infiltration of the membrana itself, and for ventilation. The condition of the eustachian tube is invariably relieved after perforation or incision of the membrane, as is the middle ear, and we are imitating nature's method when we incise early. In this case the usual symptoms of bulging and tension are wanting, and if we wait for these, the membrana may melt away between office visits, leaving a larger perforation than remains after incision. After ample paracentesis the eustachian tube and middle ear should receive the same toilette as is indicated in nontuberculous conditions, the dry wick often replaced being indicated. Of local remedies, iodoform and iodin derivatives have given best results. The use of sunlight directed by the reflection from a concave head mirror on the tympanic membrane for five or ten minutes each day has seemingly been of benefit in certain chronic cases, and I would strongly advise its use where the local process appears to be confined to the membrane. With hygienic, dietetic and tuberculin treatment increase the opsonic index to the point of tissue resistance, with the hope of limiting the process to the tympanum proper. If the process continues to the mastoid or labyrinth, as evidenced by the symptoms, lose no time in resorting to whatever surgical interference is indicated for a thorough eradication of the invaded tissue.

Care should be exercised in the choice of an anesthetic and an anesthetist, in case of pulmonary involvement, or of other marasmic condition, and to the same end the operation should be concluded with the greatest expedition in keeping with thoroughness and safety.

In the after-treatment the general condition should receive the careful attention of one accustomed to handling tuberculous cases, especially the hygienic and dietetic care.

Outdoor advantages should be had as soon as possible, and every available means used to combat the general infection and establish a resistance against the disease.

REPORT OF CASES.

The following five cases are reported, not because they are singular in nature or present any new features, but as representing some of the types of aural tuberculosis commonly seen. They are chosen from cases which fortunately are still living, and consequently the postmortem findings, always of interest to the student of pathology, cannot be given. The diagnosis in these cases was made clinically and with the microscope, none of the tissues having been used for inoculation to confirm the findings.

Case 1.—J. B. B.; born in 1884, aged twenty-four years; male. No family history of tubercuolsis. Patient had, in childhood, measles and chickenpox. Pneumonia at twelve years. In 1904, during an attack of 'grippe, had pain in left ear, followed by discharge, with rapid loss of hearing. In 1905 the right ear began to discharge, without pain, and with rapid loss of hearing. Discharge and deafness were first symptoms observed. Both ears continued to discharge, and deafness to increase until February, 1908, when patient first consulted me.

Examination of left ear revealed foul smelling discharge, containing gritty débris and particles of bone, membrana tympani absent, granulations in tympanum, and perforation in posterior wall of canal leading into mastoid cavity containing necrosed bone. Right ear in similar condition, excepting the perforation of posterior canal wall. Operation on left ear exposed large mass of flabby pale, granulation tissue, with here and there large sequestra replacing mastoid cells. Necrosis had involved the facial canal, and the facial nerve lay in this mass of débris, protected only by its sheath. Chest examination at this time was negative, as was sputum examination, made two months previous. In May, 1908, the right ear had become worse, the posterior canal wall having likewise perforated. Operation revealed the same conditions as found in the left ear, with added extension of necrosis into the labyrinth. This ear also recovered. Both ears remain well up to the present time, excepting the need for occasional attention on account of the eustachian tubes remaining patent. At time of second operation the lungs showed evidence of involvement, which progressed to cavitation, but, notwithstanding, the patient has recovered, and is earning a good salary in a bank, where he has served since 1909. He has enough hearing in the left ear to enable him to dispense with artificial aid to hearing. After the lung condition became manifest he received tuberculin treatment for some time.

Case 2.—M. S.; female; aged twelve years. Mother died of tuberculosis when patient was nine months old. Patient was breast fed first three months. Father developed pulmonary tuberculosis when child was one year old, and died of the same. When patient was three years old swelling over the left mastoid occurred, without pain, discharge or any symptom calling attention to the ear. The mastoid swelling was incised, leaving a sinus through the cortex, filled with pale granulations and discharge. The sinus was curetted several times. At four years of age the mastoid was opened, but failed to heal. One year later another surgeon operated, removing granulation tissue and necrosed bone. The wound again failed to heal, and discharge persisted for the next seven years through an opening the size of a dime resulting from the previous operations.

In 1907, at the age of twelve, when patient was first seen, there were present foul smelling discharge and masses of pale granulations in the tympanum and projecting from the posterior opening, through which bare bone could be felt. Operation in 1907 showed the entire mastoid cavity, zygomatic cells and the labyrinth to the apex of petrous bone filled with granulation tissue and sequestra, containing typical cheesy masses, giant and epitheloid cells. Everything was curetted away down to the internal table, and after cauterization of the bony wound with phenol and alcohol the wound healed kindly. In June, 1911, discharge from the ear recurred and a large cholesteatoma was removed from the mastoid area. Since this time the ear has remained well and the patient in good health, showing no evidence of tuberculosis elsewhere in the system.

Case 3.—G. W.; colored, female; aged four years. Mother had pulmonary tuberculosis when child was born, and since died of the disease. Child was well until one month ago, when she began to have fever, discharge from left ear, tenderness and swelling, but no pain over the mastoid. Operation in November, 1907, revealed the mastoid process filled with granulations, showing typical tuberculous changes on microscopic examination. The mastoid wound healed satisfactorily, but discharge from the ear has continued to the present time. In 1911 the tonsils and adenoid were removed with but little benefit to the ear or general condition, which latter remains below par, notwithstanding the absence of definite evidences of tuberculosis.

Case 4.—E. E. S.; aged thirty-five years; musician. Pulmonary tuberculosis in chronic form for fifteen years. Last six months has had slight activity, but not sufficiently severe to interfere with vocation. Two months ago noticed feeling of fullness and impairment of hearing of right ear, continuing to progress steadily and without pain or other discomfort.

Two weeks later, at first visit, bone conduction was intact, but there was considerable interference of air conduction in lower scale. The usual landmarks of manubrium, light reflex, etc., were obscured by the infiltration present. The slight hyperemia over the posterosuperior quadrant soon subsided, leaving the membrane uniformly nonvascular and thickened in appearance. Sunlight directed on the membrane each day with concave head mirror has been the only treatment except tuberculin, which was begun at the onset of the aural complication. The hearing is gradually improving, as are the objective symptoms.

Case 5.—G. P.; male; aged twenty-four years; no family history of tuberculosis. Engaged in athletics at college, and soon after graduation (two years ago) symptoms of pulmonary tuberculosis developed, which have continued in subacute form ever since. Has resided in sanitarium most of last year, and had less than one degree of temperature during past six months. State of nutrition good, and general condition is apparently excellent.

Consultation one month ago gave history of a feeling of fullness and sudden deafness of right ear two days previously, but no pain, vertigo, or tinnitus. Examination revealed a membrane considerly distended in the postero-superior quadrant, which was highly injected; the lower half being flat, anemic, and containing no visible blood vessels. The membrane throughout was greatly infiltrated, and the upper distended hyperemic area and the lower flat pale area were clearly defined. Near the periphery, all around, there was apparently greater infiltration of the membrane, giving it a distended and yet slightly transparent appearance. But at the next visit, four days later, he stated that on the night before, he had, during an act of sneezing, noticed a hissing sound in the ear, and afterwards a discharge. Examination showed the lower third of membrane sloughed away, a watery discharge, and a pseudomembranous coating, extending over the dermal layer of remaining portion of membrane and on to the adjacent canal wall. There had been no pain from the beginning, although the process had been very acute. Four days later the condition about the same, except slightly more discharge, destruction of membrane remaining the same, and corresponding to the anemic area observed at first visit. Tuberculin treatment was begun after perforation occurred, but a slight reaction followed a dose of 0.00001 gram, indicating a high degree of toxemia. A few days later he was able to take smaller doses without reaction, and the activity is seemingly subsiding.

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XLIII.

AURAL COMPLICATIONS IN TYPHOID FEVER.*

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Twenty years ago I studied the ears in 234 patients ill with typhoid fever at the Boston City Hospital, and seventeen years ago I presented a paper at the annual meeting of the Massachusetts Medical Society, giving the results of these investigations. Although I have never been able to study the ears in so large a number of typhoid patients as a group since that time, having served as an aural surgeon to a large general hospital, I have been called upon to examine many patients who had developed aural disease during an attack of typhoid or who suffered with a preexisting pathologic condition of the ear, which was aggravated by the typhoidal condition. There have also been many cases presenting typhoid symptoms and signs which proved to be due to complicated aural sepsis and not to typhoid bacillus.

In considering the subject, we have to deal with the aural complications which may develop during the course of the typhoid infection, those which have existed before the onset of the typhoid condition, and those cases of aural disease which, through extension into the lateral sinus or brain, may simulate in many ways the symptoms of the typhoid state when there is no typhoid infection present. This latter class is a very important one, both because of its extreme severity and high mortality, and because early recognition and skillful surgical interference can often save the life and enable a restoration to comparative health of those almost surely doomed to death if left to nature or to unaided medical treatment. It is quite generally known that during an attack of typhoid fever there are inflammatory conditions within the ear liable to develop; that there is often a state of deafness more marked than the aural signs or the mental depression would account for, and that these cases are liable to be refractory, due to the lowered state of the patients' vitality.

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*Read before the American Otological Society at its meeting in Atlantic City, New Jersey, May 28, 1914.

The time allowed for the presentation of this subject is not sufficient to consider the various aural complications at all thoroughly, therefore the main purpose of this paper is again to impress upon the physician who is responsible for the care of a typhoid patient the great importance of not forgetting the liability of aural complications in this disease, and of their seriously affecting the progress of the case. It is fully as important to remember that a grave aural complication may be the one and only causative agent in producing a symptom complex which may so closely resemble a true typhoid infection as for a time to deceive the skillful clinician unless he pay strict attention to the ear and its associated organs, the lateral sinus and the jugular vein. A patient may have had a typhoid infection and have presented all of the signs of that disease, and during the height or at the later convalescence of this disease may develop a purulent lateral sinus and jugular thrombosis, with all of the dangers of these complications. Not only is lateral sinus thrombosis frequently mistaken for typhoid fever, but it is a comparatively frequent complication of this disease, and probably no complication has been so frequently overlooked. There is good reason why this condition can so frequently escape the attention of the clinician. One is that the great majority of these patients are extremely ill and are very much depressed mentally as well as physically. They are often too ill at first introduction to the physician to be able to give a clear history of the onset of the disease or of their past ailments, and frequently the friends know comparatively little about the previous physical condition of the patient. This is especially true in regard to a previous aural disease which may have been comparatively slight and of short duration. There are many who have had a low type of middle ear for years who scarcely pay attention to this aural condition, and there are some who even are not aware that such trouble exists. Again, there are a few who may have an infection within the ear extending into the mastoid and to the lateral sinus without producing the usual symptoms of middle ear disease, and without leaving any signs in the drum membrane of any disease. One of the cases reported at this time belongs to this class, and the condition was diagnosed by the thickened feel of the jugular and the septic temperature chart. Many of these cases could go to autopsy, and unless especial attention were paid to the lateral sinus and jugular, the true cause of death might remain unknown. This is especially true in cases where permission to open the head cannot be obtained and the lateral sinus cannot be examined.

One of the most important considerations in this condition is the diagnosis, for if a positive diagnosis can be made there is no serious question as regards treatment. An operation to tie the jugular vein and open the lateral sinus is imperative and immediately necessary, and today every aurist is familiar with the technic and should possess the skill to thoroughly cope with this condition. It is unfortunately not always possible to make an absolute positive diagnosis in this condition. It is especially hard in many of the cases which complicate a true typhoidal condition or which develop shortly after the extension of a typhoidal infection, for there are so many conditions complicating typhoid as well as the proneness of this infection to the socalled relapses which may give increased temperature and other signs of sepsis. If there are signs of middle ear infection or mastoid extension, and we have had symptoms of pain and tenderness about the ear, or if there is tenderness of the carotid sheath associated with a septic temperature, with or without chills, a diagnosis can reasonably be made; but when we have chills and accompanying temperature without pain, without a history or signs of a middle ear inflammation, and when a blood count shows only 11,000 whites, and when there is no jugular tenderness and there are no mental or ophthalmic signs suggestive of septic thrombosis, we have to consider and eliminate if possible the other frequent complications of typhoid before giving too much weight to the probability of septic lateral sinus thrombosis. In fact, it is almost as serious a blunder to be misled and operate upon a healthy mastoid and lateral sinus in a patient suffering from some other complication of typhoid fever, as it is to overlook and not operate upon a septic sinus thrombosis. There is one very positive and valuable diagnostic sign which is often present when sinus infection has extended into the jugular. There is a phlebitis which shows a distinct change to careful palpation. In order to obtain the best results in palpation of the jugular it is necessary to have the neck muscles, especially the sternocleido muscle, as lax as possible, and the sheath of the large vessels must be palpated with delicacy and care. It is always advisable to carefully compare the jugular veins of the two sides, and yet to not forget that in health there is sometimes some variation. If the patient is not too apathetic, this careful palpation will often demonstrate a hypersensitiveness of the jugular sheath. This sign, if present, is a very valuable one; but its absence does not in the least eliminate the possibility of a septic sinus or perhaps even of a jugular phlebitis. We must also, if possible, be quite sure that the tenderness is in the jugular sheath and not in the cervical glands, for the superior deep cervical glands are often infected and sensitive when there is a simple middle ear, eustachian tube, or epipharyngeal infection.

Much has been written concerning leucocytosis, but in these cases it has been of little help. In one of our severe cases we had 11,000, and in another about 18,000. A marked polynuclear leucocytosis, when present, would add to the positiveness of our diagnosis in cases where other signs are vague or absent. It is of considerable importance not to place too much weight upon the blood findings, either positive or negative, though they may be of help when considered with other signs. Frequently the patient is not seen until the condition is well advanced. This is especially true of hospital cases, as many cases are treated at home or have no treatment until they are becoming very severe, when they are referred to or seek aid at a general hospital. We may have at these late stages any number of complications. There may be meningeal extension with the associated headache, and perhaps eye symptoms. There are also frequently foci of metastatic infection.

These may occur in the lung, spleen, heart, liver, joints or in the brain, and the symptoms and signs will be such as occur when any of these various organs become affected. These symptoms may be more prominent than those arising from the primary disease. It is the late complicated cases which are so liable to be diagnosed as typhoid fever. Typhoid patients are also very liable to develop aural disease or have exacerbations of preexisting aural disease during the course of the typhoid. These cases having a positive Widal and other positive symptoms and signs of typhoid, often complicate and add to our difficulties in making a positive diagnosis of any coexistent aural complications. It is not rare to find not only a septic thrombosis, but frequently so long a time has passed since the onset of the sinus complication that the thrombus has been broken down and the sinus become filled with a necrotic purulent mass, which only a small distal clot within the jugular may prevent from entering the circulation. The liability of this condition makes it important to first tie the jugular beyond the thrombus, if possible, before attacking the sinus within the cranium. The possibility of this grave condition complicating a typhoid infection makes it extremely important to carefully watch the ears during an attack of this disease, and especial attention should be given to this subject whenever any unaccountable symptoms of sepsis arise. We as otologists are rarely called to these cases at first, nor are they usually admitted to our aural clinics or special hospitals. The family physician and the general medical hospitals first meet the great majority of them. It is our duty to not only impress the importance of this subject upon the general practitioner, but to become as proficient as we possibly can in caring for them when called in consultation, either in private or in general hospitals. With all the knowledge and care at our present command there will be some cases so obscure and complicated that we shall fail in our diagnosis, and in this failure must blunder in operating or in waiting. It is a grave responsibility, and any work which can add to our knowledge will be of the utmost importance.

From October 1, 1913, to February 1, 1914, I was able to diagnosticate and operate upon five cases of septic sinus thrombosis at the Boston City Hospital in patients who were admitted as probably typhoid. Although these cases showed many symptoms of typhoid fever they were not typical, and the physician in charge called me in consultation for an aural examination. The Widal test was negative in four cases, and the three hour temperature chart, carried for several days, suggested septic absorption in all of them. There were signs of beginning choked discs in two of these cases.

R. C., a man thirty-four years of age, of powerful physique, was admitted to second medical service at the Boston City Hospital, October 19, 1913. He had contracted chancre fourteen years previously, and had an abscess in the right ear in July, 1913. Since July frequent attacks of headache, and three weeks before admittance a severe chill. Severe headache and fever off and on for three weeks, some abdominal pains and soreness, and slight hacking cough for over a week. There had been dyspnea for a week and vomiting for three days. Physical examination showed eyes, throat, heart and lungs to be normal. The bowels were lax and tympanitic. The reflexes were normal and there was no Babinski or Oppenheim. The blood count showed 20,000 white, and a culture of staphylococcus pyogenes was obtained. On October 22d, in consultation, the right ear showed much foul pus. The membrane and part of the handle of the malleus were gone. There was tenderness in the digastric fossa, and the jugular was distinctly thickened. There was some retinal stasis. The pupils were normal. The left shoulder and right knee were tender and somewhat swollen. Immediate operation was performed. The jugular was filled with thrombus, and it was necessary to tie below the facial vein. The lateral sinus was filled with suppurating clot to nearly the torcular. Following the operation the local condition progressed favorably, but there were several septic joints and two attacks of facial erysipelas. He was not able to be discharged from the hospital until November 30th. He has been perfectly well since.

A. H., a girl thirteen years of age, was admitted to the third medical service November 28, 1913. She had suffered with rheumatism when five years old. Was fairly well till fourteen days before admission, when she had a severe cold. There were pains all over body, especially in back. At first there was earache. Had pain about heart and loss of appetite. She was apathetic. The tongue was dry and heavily coated. The teeth were covered with sordes. There was a systolic murmur, and the apex was in nipple line. The other organs were normal. The reflexes were normal. The blood culture was negative, and the white blood count was 22,000. An examination showed the ear to be apparently normal. The mastoid was slightly tender. The jugular was distinctly thickened. I operated November 20th. The jugular was filled with thrombus, and a low tie was necessary. The mastoid was filled with granulation tissue. The sinus was thrombosed to near tercular. After the operation the symptoms were much relieved for five days, when symptoms of general meningitis developed. Decompression relieved for forty-eight hours, when she grew suddenly worse and died.

N. E., an Italian, thirty-six years old, was admitted to first medical service December 5, 1913. As far as known he had never been ill until two weeks previously. He began with headache, frontal and occipital. There was at first slight earache. He was much prostrated. The abdomen was tympanitic. The white count was 41,000. There was rigidity of neck, the right ear was discharging pus, the anterior inferior quadrant of membrane was gone. The jugular was normal to palpation. There was a slight Kernig, increased knee jerk, and Babinski both sides. The white count in spinal fluid was 300 per millimeter. A mastoid operation showed the whole bone filled with granulation and pus. The lateral sinus was exposed and found to be thrombosed. The jugular was tied and the sinus and bulb cleaned out. There was hypertension of the dura. There was relief for four days following operation, when the symptoms of meningitis returned and the patient died seven days after the operation.

B. B., a printer by trade, admitted to hospital December 4, 1913. He had been ailing for several weeks and treated for typhoid. There had been severe headache and stiff neck. The day before admission there had been three chills. Examination showed normal reflexes, negative Widal, blood count 14,000, and a general septic appearance. There was tenderness over left mastoid tip and fluctuation below tip. The jugular was infiltrated. The membrane was red and bulging. There was sagging of posterior wall. An operation was performed and the mastoid found filled with pus and granulation tissue. The sinus was thrombosed and the dura much inflamed and bathed in pus. The case seemed hopeless and the chances were that there was a general purulent meningitis. The patient died six days later.

Miss V. P., admitted November 14, 1913, complaining of blurred vision, weakness, headache, loss of appetite, nausea and vomiting, chilly sensation, prostration. When a baby had abscess in right ear. When fifteen years of age the same ear again discharged for a while. The case was diagosed as typhoid and sent to the hospital. Physical examination showed considerable emaciation. The heart and lungs were normal. The bowels were tympanitic. The white count was 20,000. The patient continued with many typhoidal symptoms, but there was no Widal and there were no typhoid bacilli in the stools. I examined patient December 10th, and found a chronic suppurating right ear. There was a spontaneous nystagmus to the left. Pressure on tragus increased this and produced marked vertigo. The jugular was distinctly thickened. The following day the jugular was tied, the mastoid was cleared, and the outer wall of the horizontal semicircular canal was found to be gone. The sinus was filled with thrombus half way to torcular. The canal of the facial nerve was very necrotic and nerve was exposed for one-third of an inch. Following the operation there was relief from symptoms. There developed partial facial paralysis, which slowly cleared up. The patient was discharged, relieved, on January 2, 1914.

It is evident that all of these cases were advanced lateral sinus thrombosis, and had the medical attendants correctly diagnosed them, or had they had the help of any otologist, the true condition would have been found and a thorough operation would have saved more of them, and perhaps could have saved them all.

XLIV.

CAUTERIZATION OF MUCOUS MEMBRANES, PARTICULARLY OF THE NASAL MUCOSA—A PROTEST.

By Ernest de Wolfe Wales, B. S., M. D.,

Indianapolis.

The normal nose is lined with mucosa, every part acting to moisten, warm and cleanse the inspiratory air. The amount of work the nose has to do is greatly increased by the dirty, smoky, ill-kept cities and the dry, overheated homes and offices, and still further increased by dusty occupations. The normal nose must have drainage room as a whole, and drainage of every gland in its mucosa. In fact, to have a normal nose an individual must have good general health. Not only may external irritants, as dust and gases, affect the nasal mucosa, but also internal irritants in the circulatory system, including uric acid, bacteria and their toxins. The lower turbinate adapts itself to the many changes of heat and cold, dryness and moisture, as well as changes of blood pressure and reflex changes by way of the nervous system. A normal nose is one of the joys of life. Even the appetite is enhanced by the sense of smell. No other sense brings sweeter memories and recollections than the organ of smell.

The object of this paper is to call attention to the fact that the function of the nose is the matter of greatest importance in the treatment of all nasal diseases, just as the function of the eye or ear is of first importance when life is not at stake. The reprehensible destruction of the nasal mucosa is so common that we as rhinologists cannot help entering a vigorous protest against this practice. If many writers were taken seriously, nearly all ills of the human body would be cured by destroying some part of the nasal mucosa. Most of these reports are one hundred per cent sure cures. There are genital spots and bladder spots as well as hemorrhoidal, intestinal, hepatopancreatic, gastric and esophageal portions on the inferior turbinate, and by simply destroying certain areas of the normal mucosa, dysmenorrhea, enuresis and other troubles are cured. It would seem that all branches of medicine and surgery will be asking for the destruction of some part of the nose for troublesome symptoms. These treatments probably have a psychic action. If one uses a harmless treatment with powerful suggestion, it may be excused, but to destroy normal nasal mucosa for a symptom or trouble that may occur repeatedly is wrong.

To preserve or improve function is our ideal, and if the breathing space is sufficient, it matters little how crooked the nasal passages may be. If the nasal mucosa is swollen and shows a normal cocain reflex, then this turgescence is temporary, due to local or general irritation. If due to local irritation, mild, gentle treatment brings quick relief. If due to general disturbance, the nasal condition improves when the general congestion is removed, whether it is in the chest cavity or the abdominal cavity. Among the disorders causing congestion in the nose are alcoholism, cirrhosis of the liver, chronic digestive disorders, especially chronic intestinal trouble, and chronic constipation, chronic disease of the heart—as failure of compensation in mitral disease and aortic insufficiency. In leukemia and pseudoleukemia, also congestion of the nose occurs at menstrual periods, at puberity, the climacteric, and during pregnancy. These cases are often sent to the specialist for operation, and make up the great number of cases where the cautery is used. It is the duty of the specialist to send these cases back to the general practitioner, and not destroy the nasal mucosa which is secondarily involved.

By cauterization is meant the application of the actual cautery and the stronger acids, such as chromic and trichloracetic, the crystals of which are fused on a carrier and applied along the turbinates. Acids cannot always be controlled, whether used on the surface or applied by the submucous method. This does not include the solutions that do not destroy mucous membrane, such as a solution of ten grains of chromic acid to the ounce of water applied to syphilitic ulcers and patches on the mucous membranes of the mouth cavity, advocated by the late Dr. Butlin of London.

Cauterization of any kind, almost without exception, should never be used in the nose. The exceptions are those cases of hemophilia or such conditions where it is necessary to save life. In fact, all solutions applied to the nasal mucosa should be so mild that they could be dropped into the eye. In other words, the nasal mucosa should be treated with the greatest gentleness. Much of the pathology of the nose is due to severe infections and neglected acute and chronic troubles, also deformities which should be treated by surgical means described in our best textbooks, but a great deal of the pathology of the nose is caused by destructive treatment of the nasal mucosa performed by the general practitioner, many specialists, and often by meddlesome treatment self administered. Most commonly the lower turbinate is cauterized, but scars on the middle turbinate and septum are not uncommon. The scars are often extensive. Sometimes the whole visible surface of the lower turbinate is whitened by scar tissue and the middle turbinate appears like an oyster.

The strongest argument against cauterization of any kind is that a slight pathologic condition is increased to a graver pathologic condition. The commonest result of cauterization is cystic degeneration. The small ducts of the serous and mucous glands are destroyed and sealed by scar tissue, causing atrophy, or the ducts are stenosed while the unimpaired glands keep on secreting and slowly form cysts. Some time after cauterization this cystic degeneration increases the size of the turbinate, and the breathing space is so impaired that a turbinate must be removed or resected. Again, these cysts may become infected and form pus sacs, which may burst or infect other regions, or by pressure cause atrophy or necrosis of the bone. Deep cauterization causes osteitis and marked atrophy.

The immediate result of these burns is a very sore, swollen mucosa, which in itself is painful. The inflammatory swelling may stop up the natural openings of the ethmoidal cells or the ducts to the sinuses, causing serous sinusitis (hydrops ex vacuo). If infection takes place, suppurative sinusitis results. Sometimes the ears are secondarily infected at this time, as well as the tonsils and eyes.

One of the very common sequela of cauterization is synechiæ, and still worse is the great amount of scar tissue. Where the columnar ciliated epithelium is destroyed, squamous epithelium takes its place. On this scar tissue the secretions from neighboring mucous membrane flow. The secretions accumulate on the atrophied areas because there are no cilia to carry the secretions along, and after remaining here the inspiratory air causes evaporation, resulting in the formation of crusts. The atrophied areas have no secretions to float these crusts off, and so they stick, often overriding healthy mucosa. These crusts tend to cause irritation, which is manifested by sneezing and often by a watery discharge. The possible after-results of cauterization of the nose cause a disagreeable dryness, often accompanied by itching. If there is considerable scar tissue, crusts cause a discomfort with constant desire to pick the nose, accompanied by soreness and bleeding, due to the irritating crusts. Inspection shows a dry mucous membrane, often inflamed, covered with thin crusts, which may be tinged with blood, presenting an appearance similar to that of the septal mucous membrane after a submucous operation. When the inferior turbinate has been streaked by the cautery, the turbinate often completely blocks the inferior meatus and finally becomes polypoid secondary to cystic degeneration, although this condition more often follows cauterization of the middle turbinate. These pathologic changes are so slow that their pathogenesis is forgotten. Where there is atrophy as a result of cauterization, the secretions become sticky and are difficult to remove. Oils often make the nose worse, and even mild alkalin or normal salt solutions seem to make the nose sore. This is due to the epithelial changes. A two per cent solution of boric acid sometimes gives relief, but must be used continuously, otherwise the patient is uncomfortable. The inflammation often extends to the conjunctivæ and keeps them inflamed. In some cases cauterization has caused interference through cicatrization with the drainage of the lacrimal and conjunctival sacs, which gives rise to a condition of conjunctival irritation which may be followed by infection and its serious after-results. Even without infection, the mere presence of conjunctival irritation and epiphora subjects the patient to a most distressing train of symptoms.

Another danger of cauterization is purulent meningitis, which, however, is rare. The bead of acid has dropped off the carrier, causing deep burns in the nose, and has rarely entered the esophagus, later causing stricture. Another danger is new growth which may start from these irritated atrophied areas. In the Indianapolis clinic, Dr. J. R. Thrasher finds about one-third of all patients give a positive Wassermann reaction. Since it is claimed by some that most cases of cancer of the tongue and larynx are secondary to syphilis, the danger from scar tissue made in the nose, when syphilis is so common a disease, makes cauterization a serious matter. A nose scarred by numerous cauterizations necessarily loses its functional integrity and imposes a vast amount of extra work on the mucosa of the nasopharynx, larynx and bronchial tree, which do not and cannot perform the nasal functions. Such a scarred nose loses its feeling and the patient suffers from air hunger. Many hay fever patients are the victims of the train of chronic irritative results of cauterization. Often the mucous membrane in a patient suffering from hay fever will not present a normal cocain reflex. Cocain and adrenalin mixtures will not shrink the tissue to give relief, yet the same tissue will appear normal and give the normal cocain reflex when the hay fever season is over. Remove the irritation and nature does the rest.

It is so much easier to burn the nose than it is to find out the cause of the swollen nasal mucosa. Since many professors of rhinology are instructing students in the art of burning the mucosa, the practice has increased to an alarming extent. Much harm has been done by cauterizing the faucial tonsils and the nosopharynx. It is difficult to estimate the extent of this irrational treatment and its effects on the health of the individual. Cauterization of mucous membranes is an abominable and shameful practice. Anything which destroys the serous or mucous glands or decreases the normal sensitiveness of the nose, impairs its protective power. It is unsurgical to make unnecessary scar tissue. Meddlesome irritative treatment and cauterization causes much of the chronic rhinitis and increases operative procedures. Why substitute squamous epithelium for ciliated columnar epithelium? It is the duty of the rhinologist to conserve as much mucosa as possible, because the mucosa is the functional part of the nose.

CONCLUSION.

Many pathologic conditions of the nose are caused by cauterization. As drinking caustic fluids generally causes death, so application of caustics to the nasal mucosa often destroys the function of the nose.

No therapy should be used in the nose that burns or irritates the uncocainized nasal mucosa, because such treatment causes chronic rhinitis.

Cauterization is a method of getting results without thought of final consequences. It is irrational and lessens the efficiency of the nose by destroying the integrity of the ciliated columnar epithelium, leaving in its place tissue which cannot carry on a single function of the nose.

XLV.

(1.)

A CASE OF SUPPURATIVE THYROIDITIS WITH PERFORATION OF THE TRACHEA.

(2.)

AN UNUSUAL INFECTION OF THE EPIGLOTTIS AND LARYNX IN A CHILD—TRACHEOTOMY —RECOVERY.*

By Clement F. Theisen, M. D.,

Albany.

The first case is that of an Italian, aged thirty-five years. He was first seen by the writer last November. The following incomplete history was obtained from his wife with the aid of an interpreter: About two weeks before, he developed a sore throat, and for several days had been spitting pus and blood. An examination of the throat at this time showed the following conditions: Both tonsils inflamed and enlarged. Slightly below and behind the right tonsil there was a discharge of pus, with an opening leading up behind the tonsil, from which pus could be squeezed out. It looked like an atypical quinsy that had ruptured spontaneously at an unusual place. The patient had lost a good deal of weight, as he had not been able to take much nourishment for nearly two weeks. A wash was prescribed for the throat, and the family was told to send for the writer if the patient did not improve. Nothing was heard from the patient for nearly two weeks, when the writer received a hurry call. On arriving at the house the patient was found sitting up in bed, breathing with difficulty. In the two weeks that had elapsed he had become greatly emaciated, and had been coughing up pus and blood almost constantly. With the aid of an interpreter we discovered that he had been in a hospital and had been treated with electricity! At this time there was a tremendous board-like infiltration and swelling of the entire front of the neck, particularly involving the thyroid gland, with a good deal of reddening of the skin. On deep palpation of the right lobe, which seemed to be most inflamed and swollen, we thought we got a feeling of slight fluctuation. Pressure at this point at once increased the cough and expectoration of pus. A diagnosis of probable suppurative thyroiditis was made, and the patient sent to St. Peter's Hospital, where the operation was performed the next morning. An incision into the right thyroid lobe entered an abscess cavity, and there was an immediate escape of air. It was found that there was an opening into the trachea almost large enough to admit the tip of the little finger. The patient got on fairly well for a week or ten days, although he constantly lost weight, when he insisted on going back home, where he died a few days later. There had been a constant profuse discharge of pus from the wound. This was examined for tubercle bacilli, but none were found. Cultures from the throat and also from the wound showed streptococci and staphylococci. No autopsy was permitted.

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*Read at the thirty-sixth annual meeting of the American Laryngological Association, May 25-27, 1914.

The primary seat of infection in this case was undoubtedly the abscess in the tissue back of the tonsil which had ruptured before the writer had been called in.

The rapid emaciation suggested a tuberculous process, but no bacilli were found in several examinations of the sputum, or in the pus. The lungs were also negative.

So far as the writer is concerned, this is a unique case.

The second case, an unusual infection of the epiglottis, is that of a boy twelve years old, who was seen by the writer early last May. I was asked to see him by the family physician, at his home in the country, a few miles from Albany. The boy had had measles a month before, and for a few days had complained of a very slight sore throat. When the throat was examined about four o'clock in the afternoon of May 6th, the only thing noticed in the pharynx was a slight redness of the mucosa. Tonsils were not inflamed. There was some trouble in breathing at this time, patient not being able to lie flat. When a laryngeal mirror was used the epiglottis was seen to be tremendously edematous and inflamed. Several incisions were made at once, and a culture taken directly from the epiglottis. An iced spray was ordered with ice in the mouth, and an ice coil around the neck. Temperature at this time was 103° F. At six o'clock the same day the boy's breathing was worse, and at seven we again went to the patient's home. He was sitting up in bed, breathing with extreme difficulty, and an immediate tracheotomy was performed. This relieved the breathing at once, and the boy made an uninterrupted recovery, but it was over a week before his temperature was normal, and there was a good deal of swelling of the glands of the neck.

The cultures taken from the epiglottis after scarification, and others taken through the tracheal canula, showed some staphylococci and streptococci. No diphtheria bacilli could be found. He was given an injection of antistreptococcic serum. The temperature, which remained high for a week, slowly subsided, and the swelling of the glands of the neck also slowly disappeared. When the swelling of the epiglottis subsided sufficiently, so that a view of the larynx could be obtained, some edema of the arytenoid mucosa was still present. This must have been considerable during the height of the attack, as suffocation was imminent just before the tracheotomy was performed. This condition was undoubtedly one of the curious infections of the epiglottis occasionally seen with a practically normal pharynx.

The writer has been of the opinion that such cases of acute infection, with edema of the lingual surface of the epiglottis, the edema being mainly limited to this surface, were distinct pathologic conditions belonging in a classification of their own. Several cases of this kind were reported in 1900.[1]

An experience with several cases this winter, besides the one that is the subject of this paper, and including one of abscess of the lateral column of the pharynx, in which the edema extended first to the lymphoid tissue at the base of the tongue and then to the epiglottis, has somewhat changed the writer's views in this respect, and has led him to believe that Semon's views still hold good.

Swain,[2] in a very instructive paper on inflammation of the lateral columns of the pharynx, reports several interesting cases. In one in particular, where he was able to make a thorough examination of the patient's throat after the rupture of an unsuspected abscess of the lingual tonsil, a subsiding swelling of the epiglottis and aryepiglottic fold could be seen.

Cases of inflammation of the lateral pharyngeal columns, either with or without abscess formation, frequently run the course of an atypical quinsy. Such was the case in the writer's case before referred to. The patient, a man aged fifty years, developed what was apparently a simple tonsillitis, both tonsils being involved. He got constantly worse, and within four or five days after the attack started, could open his mouth only with difficulty. Both tonsillar regions were greatly swollen and edematous, rather more marked on the left side. Several deep incisions in the peritonsillar tissue and in the supratonsillar fossa failed to show pus. A day or two after that the writer was impressed by the amount of swelling along the posterior and lateral wall of the pharynx, extending well up into the nasopharynx, and by the distance between the soft palate and posterior pharyngeal wall. A deep incision into the lateral swelling high up was followed by the escape of some pus, with almost immediate and steady improvement in the patient's condition. When a proper laryngeal examination could be made, considerable edema of the anterior surface of the epiglottis could be seen. This must have been much greater while the angina was severe, because there had been a good deal of difficulty in breathing. The name acute infectious epiglottis was given to the cases reported in 1900, and the writer's opinion at that time, that these cases should be classified separately, was largely based on the normal pharyngeal findings. Probably if the cases had been seen from their very beginning, a primary origin somewhere in the pharynx might have been discovered.

Semon,[3] in his valuable paper on the probable pathologic identity of the various forms of acute septic inflammations of the throat and neck, believes "that the various forms of acute septic inflammations of the throat and neck, hitherto considered as so many essentially different diseases, are in reality pathologically identical—that they merely represent degrees varying in virulence of one and the same process."

Case nine of the series of cases reported by Semon in this paper was similar in some respects to the one that is the subject of the writer's paper. It occurred in an adult and terminated fatally. In this case an acute edema of the epiglottis and arytenoepiglottic folds followed a transitory inflammation of the pharynx. When seen by Semon the pharynx was normal, but the epiglottis had been changed into "an enormous red colored edematous tumor." The patient also developed a brawny induration of the neck. This intensely acute septic condition had a fatal termination in less than seventy hours from its onset.

The origin of the infection in most such cases is undoubtedly somewhere in the ring of pharyngeal lymphoid tissue. This was so in several cases seen by the writer this winter (severe infections of the epiglottis with great edema, following apparently slight inflammatory processes in the pharynx), and has led him to believe that such conditions should perhaps not be classified as separate processes.

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XLVI.

THE IMPORTANCE OF DISTURBED METABOLISM IN THE ETIOLOGY OF SECRETORY MIDDLE EAR CONDITIONS.

By J. E. Sheppard, M. D.,

Brooklyn.

At the 1905 meeting of the American Laryngological, Rhinological and Otological Society I read a paper entitled "Otitis Media Mucosa," in which I attributed the condition to a variety of causes, amongst others, "cold in the head, nasal polypi, hypertrophied third and fifth tonsils, blowing the nose too hard, nasal douche, washing the hair," etc., and to vasomotor rhinitis in only one case. In the rather general discussion which followed, the late Dr. Sprague attributed "many of these cases to some vasomotor disturbance or disease of the nervous system," adding, "there is usually some constitutional condition, such as disease of the stomach, liver or kidneys." Dr. Richardson said: "A good many of these cases are due to vasomotor disturbances, and constitutional treatment is indicated." From Dr. Stucky's remarks I quote: "The disease is not primarily a pathologic condition, but symptomatic. The general health, especially the gastrointestinal canal, should be thoroughly investigated and regulated." I wish to give credit to these three gentlemen, and especially to Dr. Stucky, for having thought further along the etiologic line in this condition than I at least, and perhaps than most of us, had done at that time.

In the present paper I wish to extend what I have to say to a somewhat larger field, to include many of the acute tubal conditions, with or without the outpouring of more or less serous fluid into the tympanic cavity; the more purely otitis media serosa, without marked involvement, at least when we see them, of the eustachian tubes; the cases of otitis media mucosa; and most of those cases, perhaps all, in which the predominating symptom is a more or less profuse mucous or mucopurulent discharge from the ear. It is my present belief that all these cases of secretory middle ear conditions may be attributed to some vasomotor disturbance, usually a paralysis or paresis, involving in varying degrees the mucosa and underlying vascular areas of the nose, nasopharynx, eustachian tube, and tympanic cavity. In passing, I should like to emphasize the importance from the viewpoint of therapeutics of distinguishing clearly between this condition and a genuine hypertrophy of these structures. This vasomotor paralysis, or paresis, I believe to be in its turn an evidence, or expression, of some general toxemia acting upon the sympathetic nervous apparatus, and due, much more often than anything else, to a condition of disturbed metabolism and insufficient elimination.

Gould's definition of metabolism is: "The power that organized bodies possess of continuously using up and renewing the matter composing the body." By the term "disturbed metabolism" I wish to include in a rather broad general sense those abnormal conditions due to the amount we eat—to what we eat, and how we eat it, as well as to what we drink, and when we drink it; and by "insufficient elimination" I mean to include that by the bowel, the kidneys, and the skin.

Metabolism is easily disturbed by overeating, even of perfectly proper kinds of food. It is being more and more recognized, though not so generally acted upon, that mankind eats too much. By way of example, one of the most frequently observed errors is the addition to three abundant meals of a pint, a quart, or even more of milk—often sufficient milk of itself for a person to live on without the addition of one, to say nothing of three meals, a day.

A perfected metabolism depends undoubtedly to a great extent upon what we eat. Disturbance thereof arises much more often, in our experience, from excess of the protein foods, whether animal or vegetable, though oftener the former, than of the carbohydrates, although this latter group of foodstuffs would appear to be responsible for some of the disturbance, and more often in children than in adults. To cut down the supply of proteins it becomes necessary to limit the supply of meats, particularly the red meats, meat-stock soups, eggs, milk, cream, and butter, among the usual articles of food, and for excess of the carbohydrates to limit the sugars and starches, by forbidding candy and excess of sugar in any form, by limiting potato, and the substitution of whole-wheat bread for the almost universally used white bread.

Under the heading of how we eat it, I wish particularly to emphasize the importance in this class of cases of proper, meaning thereby thorough, mastication of food. To accomplish this most practically, I insist upon my patients eating their meals dry, all fluids being forbidden from ten minutes before until a half hour after eating.

With regard to what we drink, and when we drink it, the latter part of the proposition has just been answered, and can be summed up in the following phrase: "As little as possible at meals, and as much as possible between meals." As to what our patients in this condition may be permitted to drink, it certainly is true that the nearer they come to limiting themselves to water the better, and it is of great importance to curtail to a minimum the use of alcoholics, and especially so their daily use, even in small quantities. Milk should not on any account form a regular part of the diet of those who eat their ordinary three meals, and no one will, I think, claim that tea and coffee, as ordinarily used, are conducive to a perfect metabolism.

Insufficient elimination, whether by bowel, kidney, or skin, is a most important factor in the upsetting of the metabolic process.

I feel that I perhaps owe you an apology for having occupied so much of your time with what is at best but a very imperfect and incomplete outline of what is required to accomplish the desired results in the class of cases under discussion. At the same time I have been forced by many unhappy experiences to a realization of the fact that, unless we ourselves take up this end of the treatment, and act upon a proper interpretation of the picture presented by the parts with which we have to deal, we will fail to obtain results.

I might, but will not, relate to you the history of many cases that have demonstrated conclusively the futility of purely local treatment, or for that matter of any local treatment, for the achievement of permanently satisfying results in the socalled secretory middle ear catarrhs, thus completely reversing myself in what I had to say in the paper referred to above, in which I advocated repeated incision of the tympanic membrane as the only treatment that had at that time given results that were even partially satisfying.

I should like to recall to your minds the various pronouncements on this subject by our colleague, Dr. Stucky, in so far as it concerns our specialty, and as showing the far-reaching effects of disturbed metabolism on other organs and parts of the body, and as very suggestive to us, I would like to direct your attention to articles read by Dr. Plönies, of Hanover, Germany, and by Dr. L. F. Bishop, of New York, at the International Congress of Hygiene and Demography, held in September, 1912, at Washington, D. C., and published in Volume II, Part I, of their Transactions.

XLVII.

REPORT OF A CASE OF CHRONIC MENINGITIS POSSIBLY OF OTITIC ORIGIN.

By J. J. Thomson, M. D.,

New York City.

The patient, Louis S., age twelve years, was first seen by me on April 26, 1908. The previous February he had been operated upon for mastoiditis on the right side. The wound had never healed, in spite of several curettings; there was a fistula leading to the antrum, the middle ear was dry and the membrana tympani healed, and the boy appeared to be in good health.

On May 5th, nine days after his first visit, he had a severe chill and his temperature reached 104.2° F. Next morning it was 100.6,° pulse 100, and his respirations 24. That evening his temperature was 105.2.° He did not complain of any headache, there was no change in the appearance of the mastoid wound, and his fundus oculi were normal. I decided to wait a few days before operating on him in order to exclude erysipelas or other general conditions.

On May 9th an exploration of the lateral sinus was suggested to the family, the septic condition and temperature having continued. At this time the chest and abdomen were normal, he had no headache, but had a severe chill every other day. The highest daily temperature was 103.2° and the lowest 101.° The urine was normal exept for an excess of indican, the fundi were stiill normal and there was no complaint from the patient. Blood culture was negative. Blood count gave 25,000 leucocytes, 85 per cent polymorphonuclears, 9.5 per cent lymphocytes, and 5.5 per cent mononuclears. The Widal test was negative, and there were no malarial plasmodia present.

May 11th consent to open the sinus was obtained. After thorough exposure and opening no clot was found, and free bleeding occurred from both the cardiac and torcular ends. The jugular was not tied. Next day the temperature was 105°, pulse 118, and the patient had a chill lasting twenty-five minutes. He now began to complain of severe headache; the reflexes were normal and the eyes and pupils still normal.

May 13th he had a chill lasting thirty minutes, and the child was drowsy, sleeping a good deal, but in waking intervals complained of very severe pain all over his head. The cerebrospinal fluid at this time was normal, and blood count showed 15,500 leucocytes, polymorphonuclears 73.5 per cent, lymphocytes 24.5 per cent, hemoglobin 65 per cent. There was a great variation in the size of the red cells, and there were some poikilocytes. Until May 24th the condition remained about the same. On this day, on account of the temperature remaining septic and the child being drowsy, together with a weakened heart action and headache, the temporosphenoidal lobe and cerebellum were explored for pus, but none was found. From the time of this operation, however, the boy steadily improved and he was discharged from the hospital two weeks later. The wound healed promptly, and for nearly four years he enjoyed good health and mental vigor.

On March 4, 1912, I was called to see him again, and found him unconscious, and from the mother obtained the following history: At times for the past few months he has complained of slight headache, especially when stooping, and this was sometimes accompanied by dizziness. In the erect position he did not complain of either, and was never dizzy on the street. March 2d, he complained of the operated ear hurting him, and he had a headache. March 3d, at three o'clock in the afternoon, he had a slight chill, and he seemed unusually drowsy all day. At eleven o'clock he vomited a small amount of greenish fluid, and was nauesated several hours.

The morning of March 4th, he still complained of headache, began to have spasms involving all the extremities, but not the face, and at eleven o'clock he became unconscious and began to grind his teeth. His temperature, taken at this time, was 104° I saw him in the evening. He was unconscious, pulse 78, temperature 104°, and was slightly rigid, but had no convulsive movements. The pupils were equal and both contracted to light. There was a slight divergent strabismus, and a conjugate deviation of the eyes to the right. There was no nystagmus, but the eyes continually rolled from one side to the other, rarely passing the middle line on the left. The fundus could not be satisfactorily seen. There was no Kernig or Babinski sign, and the knee jerk could not be elicited. The mastoid wound was red and bulging slightly. The canal was so contracted that only a small portion of the membrana tympani could be seen, and this was quite red. Caloric test produced no result on the movement of the eyes.

That evening I opened the old mastoid wound and found the cavity of the mastoid filled with a brain hernia which was necrotic and very dark in color. There was no pus in the mastoid. The hernia was removed and the child returned to bed. He died the same night.

The autopsy findings were as follows: The dura is adherent over the middle line, and on removal tears away particles of brain tissue. The convolutions seem to be flattened on both sides of the brain. The pia is slightly opaque, and all the cerebral veins are much engorged. The brain seems unusually soft to the touch. A milky greenish yellow opacity follows all the veins of the cerebrum, and less markedly so those of the cerebellum. This looked like an exudate beneath the pia, but on stripping off the pia no exudate was seen and the opacity proved to be a thickening of that membrane itself. At the division of the larger vessels patches as large as a dime were present. The left lateral ventricle contained about .5 cc. of fluid, and the right lateral third and fourth ventricle contained no fluid whatever. This may account for the fact that we were unable to get any fluid from the spinal canal, either before or after death. The floor of the fourth ventricle showed very small petechial hemorrhages on its surface. The brain tissue itself in the cerebrum, cerebellum, pons and basal ganglia was normal. There was no indication of inflammation surrounding the area from which the hernia had been removed. The thickening of the pia was as marked over one hemisphere as over the other, and in many places was so adherent to the brain that it could not be stripped off without tearing it. There were small hemorrhages throughout the falx cerebri, and the veins of the falx cerebelli were tortuous and thickened, also those of the tentorium. The wall of the superior longitudinal sinus was very much thickened.

The condition was apparently one of chronic meningitis, in which an acute exacerbation occurred, causing death. It is possible that the thickening of the pia may have been a result of his previous illness, at which no cause for the septic temperature was discovered and in which no diagnosis had been made. There was no fresh exudate found, and the process was so soon followed by death that it would appear to be caused by intracranial pressure due to edema or other cause, rather than by toxemia.

XLVIII.

THE USE OF VACCINES IN CHRONIC EAR INFECTIONS, WITH REPORT OF CASES TREATED.*

By William H. Haskin, M. D.,

New York.

Now that the first enthusiasm for the radical mastoid operation—which led to vast numbers being subjected to it—has somewhat subsided and the profession has awakened to the actual results that have been produced by indiscriminate operative procedures on chronic suppurating ears, many are endeavoring to find some other method of treatment which will avoid the increased death rate that has followed its advent. Any careful and thoughtful reader of medical literature is bound to realize that the operation must be classed as an exceedingly dangerous one because of the subsequent conditions that so frequently arise, which must be attributed to the operation.

This paper is not on the subject of the radical operation, however, but is to tell of the work that is being done in Dr. McKernon's clinic with vaccines in the treatment of chronic suppurations. In no disease is the golden rule more applicable, and it is pretty certain that there are few medical men who would submit either themselves or any member of their families to this dangerous operation until after every other method had failed. We rarely find it necessary to operate upon our private patients, for the simple reason that careful treatment, given personally, seldom fails to relieve the patient. As a matter of fact, the writer has not performed a radical operation upon a private patient during the past eight years.

With the vast armies that flock to our clinics we naturally have a far more difficult problem, having in so many instances to deal with filth, poverty, ignorance, and superstition, a combination that makes it almost hopeless to get results by any method; even operations failing. When these clinic patients are fairly intelligent and have risen above filth and actual poverty, they can be taught to understand their condition and the correct methods of taking care of their ears with most gratifying results. There are always some cases, however, that appear to resist every effort, and during the past winter we have been trying autogenous vaccines upon these, following the general plans as laid down by Dr. Nagle in her two papers in which she reported the results of vaccines in seventy cases. She did not give the bacteriology nor describe the actual conditions found in these, so that her work has been questioned by many. This is an injustice to her, when it is realized that the large percentage of the cases were referred to her by such men as Blake, Cobb, Emerson, Mosher, Walker, and others in Boston, and that the actual laboratory work was done in the Harvard Medical School, so that all of her work was actually under supervision.

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*Read before the Section on Otology, New York Academy of Medicine, March 13, 1914.

She says: "In all, seventy cases have been reported by me during the past four years. Of these, sixty have remained dry; five failed to continue treatment; two have recurred; and three are still under treatment. It must be remembered that many of these cases were so persistent that the radical operation had been urged.

"While I recognize that the personal element enters into a report of any new line of treatment, yet I have endeavored to counteract this by having the results supervised."

Her last statement is undoubtedly true, and applies not only to her work, but to the different results that will be obtained by any two men working on the same lines in a given series of cases.

In 1908 the writer reported the results of treatment of chronic suppurations with active cultures of the lactic acid bacillus in a series of cases. The striking results then reported have continued to be obtained in a great many others, and the cultures are generally the first thing ordered by him in all chronic cases, careful instructions being given each time. Many associates have told him that they do not get results, so that here again the personal element must play a part, as there is no doubt of the results in the writer's hands, many of the patients having been observed by members of the clinic.

After reading Dr. Nagle's papers we realized why we had failed to secure satisfactory cultures in our first attempt, made about four years ago. We now first cleanse the canal with the vacuum cleaner, sucking out all visible secretions from the attic and eustachian tube. Then a pledget of cotton saturated with alcohol is packed in the canal and kept there for five minutes. If the perforation is large enough the sterile platinum loop is introduced into the attic, and any secretion is transferred immediately upon blood acetic agar plates. If perforation is small the Siegel otoscope is used to draw into sight any secretion there may be, and transfer is then made. A slide is then smeared with secretion obtained on a cotton covered applicator.

With this technic, we have never failed to secure growth of one or more pathogenic bacteria, from which active autogenous vaccines have been prepared.

Of the patients treated, several had been coming to our clinic for years; others had been treated elsewhere until operation was proposed, while others denied ever having had any treatment. All cases were diagnosed and assigned for treatment by the examining surgeon.

It is unnecessary to describe to this assembly the actual condition of each individual ear. Suffice it to say that almost every possible pathologic change was found in one or other of these cases, including polypi, cholesteatoma, adhesive bands, fistulæ, caries, and constrictions. The patients included the young and old of both sexes, and were drawn from all quarters. Dr. Rae had performed a most successful operation on one ear of a patient, and left the other to be treated with vaccines. Several patients had already been operated upon, but discharge persisted.

Although we have had about one hundred and eighteen cases assigned to us, comparatively few (thirty-three) have been given vaccine, owing to the fact that in the others all discharges were arrested by local treatment before the autogenous vaccines could be prepared or they had failed to return. Owing to the small number of cases and the short period of observation, this paper is offered only as a preliminary report, from which no positive conclusions are to be drawn. Before this can be done, it will be necessary to treat several hundred cases and follow them over a period of years, to observe the ultimate effects.

Since beginning this investigation we have had one hundred and eighteen cases assigned or transferred to us. Cultures have been taken in only fifty-two, and vaccines have been administered in only thirty-three of these. This is explained in three ways. In a large number of cases the discharge stopped under careful local treatment; some failed to return; and a few objected to the hypodermic administration. We have included in the list seven cases of mastoiditis which were cured by vaccines about a year ago. Three other mastoid cases have been cured this winter that are not included. Dr. Brown has also reported eight other cases, treated by vaccines for furunculosis, in which chronic middle ear suppurations, existing at the same time, were cured by the vaccine. One case of ours, still under treatment, had been operated upon twice in another clinic without relief, and was then referred to us and is now practically well. Two cases were operated upon by Dr. C——, but discharge persisted until vaccines were administered, when they promptly dried up.

Of the ten cases of mastoiditis, four were streptococcus infections; five, staphylococcus; and one, bacillus proteus vulgaris. All ten made prompt and complete recoveries.

We have not followed the dosage as used by Dr. Nagle, but have given much larger doses from the beginning, repeating every fourth or fifth day, and stopping as soon as the ears have become dry. The patients are then requested to report every two weeks for observation, so that any recurrence could be promptly noted. As Dr. Nagle states, under vaccine treatment the patient's general health almost invariably improves, this being especially noticeable in children.

In her first paper Dr. Nagle reported that in a number of cases a stock laboratory staphylococcus vaccine had been given while waiting for the autogenous vaccine, and that marked improvement was frequently noted even when other bacterial infection was present, the resistance for the other bacteria being apparently raised by the stock vaccine. This interesting observation is clearly borne out in the eight cases reported by Dr. Brown, in which there were both furunculosis and middle ear suppuration present. His case No. 10, where a mastoid operation had been performed and vaccines had been used elsewhere, is particularly interesting, illustrating again the importance of the personal element.

Four of our own cases were also double infections of furunculosis and chronic suppurations, and stock staphylococcus vaccines were given, with resulting cure of both conditions.

As shown by the table, thirty-three cases received treatment with vaccines. Of these, two are noted as "final results unknown," as the patients failed to return after their ears became dry; eight were improved and are still under observation; twenty-three have dry ears and are seen about every two weeks. All have appreciated the personal interest shown to them, and it is fairly certain that they will return on the first indication of any discharge appearing.

As said before, excepting the mastoiditis infections, all our cases have been seen during the past five months only, and we are not justified in claiming absolute cures for them. We hope to follow them for several years, as has been done by Dr. Nagle, and to report them again, possibly each year. In our own mind we are convinced that most excellent results have been obtained with the vaccines, especially so as many of our cases had resisted all other efforts, even failing to dry up after operation.

As so many cases have dried up under our local treatment, it may be interesting to state the method employed. It is well to remember that in treating any suppurative process in the ear it is necessary to keep all moisture out of the canal. If the patients are told to irrigate, it is safe to say that the canals are never actually dried after the irrigation, and treatment will be prolonged indefinitely. Bichlorid irrigations invariably keep up discharge, if persisted in, due to the irritation of its constant presence in the canal. We have found that active cultures of the bacillus Bulgaricus will promptly overcome offensive discharges in most cases, and when the membranes are thickened the cultures frequently restore them to a healthy color after a very few applications. We employ suction with small cannulas to remove all secretions from the canals, tympani, and attics, and as soon as the offensiveness disappears, sufficient drying powder—aristol or nosophen with compound stearate of zinc or boric acid—is blown in to fill the inner portion of the canal. At subsequent visits the canal is cleaned with suction, or alcohol on cotton applicators, if there has been no secretion, and is again dusted, and the patients are told to do nothing except to wipe out any secretion that may come.

In private practice the writer has yet to see a case that has not dried up and remained so under this method of treatment, when combined with proper nasal care.

XLIX.

TWO OBSCURE CASES OF RESOLVING MASTOIDITIS—THE OPERATIVE INDICATIONS.*

By Hugh B. Blackwell, M. D.,

New York.

On November 18, 1913, Mrs. C. was admitted to the New York Eye and Ear Infirmary for mastoid operation. She gave the following history:

Some five weeks before, she was suddenly taken ill with a severe ache in the left ear. A more or less unsatisfactory myringotomy was performed. Some three days later I was called to see her for the first time. Aural examination revealed an acute middle ear abscess with unruptured drum and dry canal, associated with moderate tenderness over the tip, antrum, and emissary regions. A myringotomy was performed under gas anesthesia, and was followed by a free escape of pus and blood. I did not see the patient for the following ten days, at the end of which time she reported at my office. Aural examination revealed a dry canal, healed drum, absence of mastoid tenderness, hearing about normal. The patient, however, complained of some malaise, and had a temperature of 100.4°. She stated that she had had a tuberculous infection of the lungs and had suffered from a chronic form of intestinal catarrh. Examination of her chest revealed an old lesion in the right apex. The patient continued to report for the following eighteen days at the office, coming at intervals of three or four days. Being a very active woman socially, she was out nearly every day, and, also, generally in the evening. She stated that about every fourth or fifth night she had difficulty in sleeping, due, as she expressed it, to a sense of fullness and heaviness in her head, but without any actual pain in either her head or ear. Her head would feel queer at those times, and on the following day she would not feel so well, and in consequence came to see me at the office. At these times the aural examination was absolutely negative —normal drum, normal hearing, no mastoid tenderness, but generally a temperature of 100° or 99.6°, never over 100.4°. The patient, who was a very intelligent woman, stated that she believed this amount of temperature was a normal condition with her, owing to the intestinal catarrh and, possibly, to the chest condition. She was convinced, however, that her head was not right. Accordingly she was sent to Dr. Dixon for an X-ray examination. This was sixteen days after the drum became normal and thirty days after the onset of the ear trouble.

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*Read before the Section on Otology, New York Academy of Medicine, March 13, 1914.

The right or normal side showed a pneumatic mastoid, with cells running fairly high in the squama and forward to the postglenoid process of the zygoma. The sinus was a little forward.

The left—diseased—side showed the same type of big zygomatic cells running forward to the tubercle. The sinus was a little forward and covered with cells. The whole mastoid was a little hazy as compared with the right side. Dr. Dixon stated that he did not consider that the plate warranted opening the mastoid, as the haziness was very slight.

Thirty-one days after the onset of the trouble, and eighteen days after the ear had apparently returned to the normal, and three days after the X-ray examination was made, the patient suddenly developed symptoms of basilar meningitis and died within twenty-four hours. A few hours after the symptoms of meningitis she was sent to the hospital, and a simple mastoid operation was performed, the entire under surface of the temporosphenoidal lobe being exposed, as well as a portion of its external surface, about one inch in width. The dura of the posterior fossa, internal to the knee of the sinus, and also the sinus itself, and cerebellum, posterior to the sinus, was exposed throughout. No pus was found in the mastoid; only some softened bone in the region of the antrum, and scattered granulation tissue. A great many of the cells contained air. The mastoid looked as though it had almost resolved. The dura did not present any abnormal appearance, and the brain did not seem to be under any tension. It was not incised at that time.

Eight hours after the operation the dura of the middle and posterior fossæ was incised and the brain of middle and posterior fossa explored with the knife. No result.

Just prior to the operation the blood examination showed 33,500 leucocytes and 91.6 per cent polymorphonuclear leucocytes.

The spinal fluid drained from the cord, at the time of operation, was very cloudy and showed 3500 cells to the cubic millimeter. Smears from this fluid showed a large number of mixed germs present—pneumococcus, streptococcus, and staphylococcus.

Death ensued sixteen hours after the operation, with a typical end picture of meningitis—e. g., opisthotonos, dilated irregular pupils, strabismus, coma, temperature 106°, rapid pulse, etc.

Case 2.—On January 20, 1914, R. B., forty-six years of age, was admitted to the service of Dr. Robert Lewis, at the New York Eye and Ear Infirmary, for mastoid operation, with the following history:

Eighteen days before admission he was seized with pain in the left ear. After three days of more or less pain the left drum was incised; the ear discharged for a day or two and then the discharge ceased. For the past two weeks the ear had been dry, and the patient suffered no pain in his ear and had no definite pain in his head. During this time, however, he was unable to sleep, claiming that his head felt queer, and in consequence he was nervous. He was quite sure that he had no headache or earache.

Aural examination showed a dry external auditory canal. The drum was intact and almost normal in appearance, with no bulging. The hearing was good, and there was no mastoid tenderness.

On January 19th, the day before the operation was performed, the blood was examined and found to contain 17,000 leucocytes and 60.8 per cent polynuclear cells. An X-ray examination was made at the same time by Dr. Dixon, and his report reads as follows: "The right, or normal side, seems to be an infantile mastoid, with sinus well formed. The left, or diseased, side is rather large celled, pneumatic in type, and cloudy throughout. The sinus is covered with rather indistinct cells and seems to be forward. It appears to be an operative case from an X-ray point of view.

Operation was performed, and the mastoid was found to be filled with pus and granulations. The patient ultimately made a good recovery, and is now cured.

CONCLUSIONS.

These two cases represent the extreme ranges of pathologic change which may take place within the mastoid without giving any definite symptoms of ear disease. The first case shows that only a very slight pathologic change in the mastoid may produce a most severe intracranial complication—e. g., meningitis; and also that it is impossible for the X-ray to determine the severe nature of these slight pathologic changes.

The second case illustrates the value of the X-ray in recognizing the more marked pathologic conditions within the mastoid, when those conditions give rise to no definite clinical symptoms.

As regards the operative indications in these cases, it does not seem that any definite indications can be laid down. Certain points are shown in these two cases. First, the history of previous ear disease. Second, the strange restlessness shown by these two patients. They seemed to be in a state of mental stimulation—due possibly to the congestion or stimulation of the brain, and their conviction that their heads were at fault, and their persistence in sticking to this idea, although neither of them had any subjective or objective symptoms—no pain in either the ear or the head—but simply the conviction that the head was at fault. Third, the slight temperature, as shown in the first case, the malaise, the indefinite character. Fourth, the importance of eliminating all other causes as etiologic factors in producing the above symptoms. Fifth, the importance of the X-ray in making a diagnosis in these cases. The first case did not have sufficient pathologic changes in the mastoid to reveal the condition in the X-ray plate, but in the second case the pathologic condition was quite marked, and the diagnosis was made on the X-ray report. When the latter patient was seen in the clinic, it was not thought that an operation would be necessary; but as the X-ray plate showed a diseased mastoid, despite the fact that there were no symptoms of mastoiditis, an operation was performed, and the mastoid was found to be filled with pus and diseased bone.

L.

REPORT AND COMMENTS ON TWENTY-SIX CASES OF TONSILLECTOMY, TWO AND A HALF YEARS AFTER OPERATION.*

By Alfred Lewy, M. D.,

Chicago.

Last winter we undertook to examine a number of patients on whom tonsillectomy had been performed two and a half or more years before, with a view to ascertaining the permanent results obtained and adding to the sum total of our knowledge concerning the results of this operation. A similar and larger list was published by Clark, of Boston (Annals of Otology, June, 1913), and altogether his results appear more favorable than ours; but his list being larger, he does not publish his cases in the same detail as is herein observed. These patients were all observed at the Illinois Charitable Eye and Ear Infirmary, on the service of Dr. Norval Pierce, and all but one or two of them were operated there.

Four hundred cards were sent out, as a result of which twenty-four patients reported for examination. Two others, not on the card list, came in for other reasons, and are included in the list below.

The conditions investigated were:

Local.—Remains of adenoid or tonsil tissue. Deformities. Present condition of upper respiratory tract.

General.—Growth and nutrition as compared with other (nonoperated) members of the same family. General health. Tendency to local and systemic infections. Cervical adenitis; goitre; condition of ears.

The results are reported in detail in the following list:

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*Read before the Chicago Laryngological and Otological Society, March 17, 1914.

REPORT ON TWENTY-SIX CASES OF TONSILLECTOMY TWO AND A HALF YEARS AFTER OPERATION.

No.	Name.	Age.	Cause for removal.	Result.
1	J. B.	9	Frequent sore throat; discharge from ears.	Left ear well; chronic suppuration in right ear.
2	S. F.	8	Postnasal discharge.	Discharge same, otherwise well. Tonsils and adenoids completely removed.
3	J. V.	15	Size.	Frequent and stubborn laryngitis since operation. Pus in olfactory fissure and in nasopharynx. Small tonsil vestige.
4	J. E.	12	Colds and sore throat.	Well since operation. Small tonsil vestige.
5	A. V. D.	8	Nasal obstruction; discharge from ear.	Looks well; ears dry, but occasional pain. Eczema narium and discharge from nose.
6	E. E.	8	Size.	Below average size for age; left membrana tympani retracted.
7	A. Z.	12	Unknown.	Tonsil vestige; nosebleed; hypertrophic pharyngitis; mentally subnormal.
8	L. B.	24	Frequent sore throat; chronic suppuration in ears.	Ears dry, but membrane perforated; occasional sore throat.
9	J. R.	25	Chronic suppuration in ears.	Ears dry; tonsil vestige; also had septal spur removed.
10	M. F.	14	Unknown.	Tonsil vestige; fauces now inflamed; septal ridge unremoved.
11	M. S.	10	Chronic suppuration in ears.	Thin and pale, but ears somewhat better. Voice of nasal obstruction, but no adenoids present.
12	R. A.	10	Size.	Is well and was before operation.
13	J. L.	12	Size; earache.	Chronic suppuration in left ear; O. M. C. in right; purulent nasal discharge; cervical adenitis; strabismus; below average size, but well nourished.

REPORT ON TWENTY-SIX CASES OF TONSILLECTOMY TWO AND A HALF YEARS AFTER OPERATION.

No.	Name.	Age.	Cause for removal.	Result.
14	A. F.	15	Size.	Septal deviation; prognathism; right membrana tympani retracted; nutrition good; diphtheria and mumps since operation.
15	J. P.	5	Size.	Small, pale and thin; left membrana typmpani calcareous; right opaque and retracted; acute rhinitis now; infrequent colds.
16	M. F.	42	Suppuration in ear.	Mastoid operation about same time with cure. Health better since.
17	A. H.	11	Size.	Mouth breather; high arch, small nose; retracted right membrana typmpani; slow in school.
18	G. V.	11	Deafness.	Hearing good now; small and thin.
19	H. N.	15	Size; adenitis.	Cervical adenitis less than six months ago; under size; no menstruation yet, though sister began at 14; mother dead; tuberculosis.
20	S. T.	13	Nasal obstruction and sore throat.	Relief four months; now again nasal obstruction and sore throat, but less frequently. Frequent laryngitis. Small tonsil vestige. Occasional nausea.
21	A. M.	18	Unknown.	Thinks he is stronger since operation; laryngitis; follicular enlargement on pillars of fauces.
22	H. D.	20	Nasal obstruction.	Chronic follicular pharyngitis; "lump" in throat; slightly deformed arch.
23	A. W.	13	Frequent sore throat; nasal obstruction.	Breathes freely; less frequent sore throat; enlarged cervical glands and small goiter.
24	I. M.	14	Size.	Slight adenoid vestige and lateral pharyngitis right; large and fat.
25	R.	8	Cervical adenitis.	Subsidence of adenitis after operation eleven months ago. but recurrence now; submental and posterior cervical groups involved; tuberculosis. (?)
26	H. K.	7	Size and frequent sore throat.	Operation three years ago. Under size; both membrana tympani retracted, but less sore throat.

COMMENTS.

Nine patients, Nos. 1, 4, 5, 8, 9, 12, 16, 18 and 23, were improved or cured of the condition for which the operation was performed. Four of these were operated because of suppurating ears (Nos. 1, 8, 9 and 16), and one, No. 18, for non-suppurative deafness. The improvement in these cases may have been due to the removal of adenoids, which was done at the same time. No. 16 also had a mastoid operation.

Seventeen patients were apparently not benefited. Three, Nos. 3, 20 and 21, are now troubled with laryngitis, which tendency appeared subsequent to the tonsil removal. It is rather difficult to account for this except in the case of No. 3, which shows evidence of sinusitis.

Of five patients under the age of six at the time of operation, three, Nos. 6, 15 and 26, are undersized. Of the other two who seem to be of good general health and development, No. 2 still has the postnasal discharge which was one of the indications for operation, and No. 5 still has a nasal discharge, although cured of a discharging ear. In neither could sinusitis be demonstrated, nor does either show any tonsil or adenoid vestige.

There was little to criticise so far as the mechanical part of the surgery was concerned. One patient showed a little asymmetry of the arch. Several showed slight tonsil remains but not of a degree or kind that appeared to be causing any trouble.

The conditions that appear to have been benefited are "frequent sore throat" and "ear troubles." Of course the cases of simple hypertrophy were relieved of the enlargement, but two of these and one other, in children under six, now show evidence of retarded growth; whether due to the removal of tonsils or not we cannot say. Only one child gave a history of infectious disease since the operation, but many of the patients are of an age when the diseases of childhood are no longer common. In none of the cases do we get any light on the subject of the relation of the tonsils to arthritis or other systemic infections.

Twenty-six cases are too few from which to draw any definite general conclusions; however, we must admit that so far as this list is concerned the results obtained did not justify the operation in seventeen out of the twenty-six. I believe our indications for operation are as conservative as those of any clinic in Chicago, but we now restrict still further our indications for tonsillectomy. In children before the age of the second dentition I believe we should perform a tonsillotomy for simple hypertrophy, or wherever possible confine ourselves to removal of the adenoid hypertrophy. This of course does not apply to cases where the tonsils are removed because they are manifestly diseased or for systemic conditions. There are few operations attended by more gratifying results than is tonsillectomy in properly selected cases. The above list suggests that we still have something to learn about the proper selection of cases. I do not think the removal of tonsils is indicated in the absence of direct evidence of their causal relation to the condition for which relief is sought, that is, on suspicion, except perhaps in the case of certain systemic infections (arthritis, etc.), in which diligent search by competent men has failed to reveal any other source of infection or portal of entry, and in which other systematic treatment has failed.

LI.

DOUBLE RADICAL MASTOIDECTOMY IN DEMENTIA PRECOX WITH PHENOMENAL IMPROVEMENT IN MENTAL AND PHYSICAL CONDITION.*

By George E. Davis, M. D.,

New York.

Some time since, Stucky called attention to some serious forms of mental disturbances arising from chronic suppuration in the nasal accessory sinuses, and reported a number of cases. When we consider the complex nervous mechanism controlling the mind and body, and that their every function is a manifestation of direct or reflex stimuli, we can readily understand how a pathologic process in any part of the organism may react upon and disturb such intricate and delicate mechanism. Therefore, if this is so in the rational subject, we are on safer, or, at least, less polemic grounds, in assuming that the toxic action of suppurative processes, particularly if situated in immediate proximity to the great nerve centers, will produce a relatively greater mental disturbance in cases afflicted with psychoses, ranging from the simple neurotic to the profoundly insane.

The precox case I am reporting comes under the latter classification. The beneficial results, mental and physical, following a double radical mastoidectomy, on account of chronic middle ear suppuration, seem to bear direct evidence as to the effect sepsis had in aggravating his psychosis and lowering his physical condition.

The following is a brief abstract of the history of the case:

Thomas R. M., age, twenty-three years; nativity, Germany; occupation, painter; married. Was admitted to Central Islip State Hospital, September 12, 1907. On admission he had a dull, apathetic look, appeared somewhat bewildered and a little restless. He answered questions relevantly, but in a dull way, and frequently appeared to have difficulty in thinking and remembering. His memory was impaired for recent events. Reasoning and judgment were very defective. Physically he was poorly developed, assumed unusual poses and positions, and gave little response to tests. Knee jerks sluggish.

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*Read before the Section on Otology, New York Academy of Medicine, April 10, 1914.

After admission he appeared dull and depressed; stared about in a confused way. He became generally more untidy in his habits, and was at times destructive to his clothing.

On March 25, 1909, I did a radical mastoid operation on the right side; a large cholesteatomatous mass was found.

May 4, 1909, I performed the same operation on the left ear, the right having closed in and showing only a slight discharge. Patient progressed without incident after the second operation. He appeared confused and was unable to give any information concerning his feelings.

During June and July he showed a gradual but very marked improvement in his mental condition. He became neat and tidy in his habits, bright and active in his appearance, was able to answer questions in a relevant way, and his memory appeared very good.

Physically, there was a marked improvement in his health, and a gain of several pounds in weight. During the remainder of his residence in the hospital he continued to show a mental and physical improvement. He talked and wrote in a rational way; showed no evidence of delusions or hallucinations. He was well behaved, had a good grasp of his position and surroundings, but was inclined to be somewhat listless. At the time of his discharge he had gained many pounds in weight.

He was discharged June 16, 1910, to his own care, to accompany his sister to Germany.

A second case I have to report from my records is even more convincing than the first, as to the deleterious effect of septic processes on the mental conditions, particularly in the insane. The patient, J. T., age, twenty-one years, Irish, was admitted to the Psycopathic Ward, Bellevue Hospital, November 26, 1910. He was noted as being restless, excited and disturbed, and had to be forcibly restrained. He was transferred to Central Islip State Hospital, November 29, 1910. There the record shows that he continued to be markedly excited, without any tendency to improvement. On December 12, 1910, his right ear was noticed discharging and he began to show mental clearing; he appeared to steadily improve until December 30th, when his temperature suddenly rose, and examination showed the opening in his ear drum had closed. There was a second spontaneous rupture with a free discharge of pus and a relief from the symptoms, but this did not continue, so, on January 5, 1911, I performed a right mastoidectomy. The hospital chart on January 11, 1911, further records that "there has been a fairly steady progressive improvement in the patient's condition since the operation. Temperature this morning is normal for the first time. He is free from discomfort and is mentally celar. He is rather subdued in manner, does not talk freely, but reads newspapers and letters," etc.

"February 3, 1911. He has been quiet and tractable and has conducted himself in a normal manner, conversing with others, reading papers and magazines, corresponding with his relatives. He was today given a complete mental examination and was found to be normal."

"March 2, 1911. The improvement in his condition has been maintained and he was today discharged in care of his sister."

The hospital report of this case, made by Dr. West, one of the staff, shows that here we have a psychosis occurring in a young man, twenty-one years of age, normal makeup and good heredity, characterized by delirium, disorientation, and overactivity, flight and distractability, clearing up, with an amnesia for a period covering about three weeks, due probably to tonsillitis followed by otitis media and mastoiditis, accompanied by emaciation, exhaustion with uneventful recovery following mastoidectomy.

He concludes by stating that this was a maniac depressive psychosis, and that the mental symptoms were the expression of the underlying physical disorder. He interpreted "the symptoms, as the delirium, disorientation, restlessness, and amnesia of an infective exhaustive psychosis, an infection delirium."

LII.

FURUNCULOSIS OF THE EAR WITH TREATMENT BY VACCINES.*

By H. Beattie Brown, M. D.,

New York.

Since the introduction of vaccine therapy, as suggested on a scientific basis by Jenner, the number of research workers has been large, and while most of the recent work in this field has followed the lines laid down by Wright of London, perhaps the two investigators to whom we owe most are Hiss and Dwyer of our own city—and I am glad that Dr. Dwyer is present with us tonight to enter into the discussion of this subject.

Although opposition to vaccine therapy was at first almost universal, even as late as 1910, when Dwyer furnished to the profession his very valuable article on the production and use of the vaccines, many of our profession were still loud in their denunciation of this form of treatment. Nearly five years have passed, and today one is safe in saying that owing to the painstaking and laborious work of investigators in this field we have a preparation the value of which can scarcely be overestimated, and when used in the correct way, by the proper man, at the right time, we have in the Hiss extract of leucocytes, and in the vaccine, agents for combating certain diseased conditions that have no equal, and whose use has abundantly proved all that is claimed for them; and now the almost universal cry of the profession is for the use of the vaccines. Inasmuch as it is from gatherings like this that ideas go forth not only to the profession but to a world of manufacturers as well, it appears to the writer that this is an opportune time to advise as strongly as possible against the use of stock vaccines, put up and sold by all sorts of manufacturing concerns. There are even now many physicians attempting to secure results from the vaccines, some of whom express themselves as having no faith in these remedies, and I am inclined to believe that such skepticism is the result either of a lack of acquaintance with the preparation used or because, having used a wrong preparation prepared in the wrong way, used at the wrong time, upon the wrong patient, a good effect has not been produced.

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*Read before the Section on Otology, New York Academy of Medicine, April 10, 1914.

At the very beginning it is necessary to recognize the fact that the Hiss extract of leucocytes, the serums, and the vaccines, are three independent and wholly different preparations; performing their work in the system by different physiologic methods, and not all intended for use in the same patient at one time.

We consider now the vaccine therapy in its relation to aural lesions, and, particularly, furunculosis, the foundation of which is the fact that when a foreign body, especially one of an albuminous nature, is injected into the human system, it stimulates the system to the formation of antibodies which combat the offending organisms, and that each particular strain has power only to form antibodies of a corresponding nature in the system. It is easy to see that if the physician injects into a patient a strain of staphylococcus vaccine, while the infecting agent in the patient's system is the streptococcus, inasmuch as the organism injected can only form antibodies that will combat organisms of its own species, in the case just specified there would be no antibodies formed to act against the streptococci, and the natural result, which ought to be expected, would be failure. Therefore, two facts are self-evident: First, the right vaccine must be used. Second, a correct diagnosis ought to be made before beginning treatment.

There seems to be no limit to the number of articles written upon the first question—What vaccine shall be used? Answer, without any hesitation: An autogenous vaccine.

Autogenous vaccines are procured from cultures made from the patient who is to receive the treatment. In autogenous vaccines the species of bacteria are isolated and grown in pure culture, from which the vaccine is produced, and when used in a single strain, or in combination, the proper dosage is regulated at the time of administering it.

The "market"—socalled "stock"—vaccine is in many cases the product from some old original strain, kept no one knows how long on artificial media in the manufacturer's laboratory.

The name "polyvalent" has been applied to a shotgun charge of mixed stock vaccines, the purpose of which is to hit a minute and possibly uncertain species of bacterium with a charge of therapeutic ammunition that will spread over a large area.

There is too often no correspondence between the contents of such vaccines and the organisms which they are intended to combat, and, moreover, their use is unscientific and decidedly unfair to the patient. As a remedy for lack of skill, stock vaccines—often fantastic in their composition, and of no value—are proposed by the manufacturer. We do not know what will be proposed next. It may be unknown mixtures of dangerous composition, let loose upon the profession like a flood, and heralded as the genuine thing that will overcome every form of microbic or bacterial infection. Surely it is a duty incumbent upon every member of our profession, and particularly upon the members of this society, to deprecate the use of these miscellaneous productions, and especially so in view of the fact that now there are so many reliable men and laboratories of our own profession who furnish the correct thing.

The second question relates to diagnosis. It is evident from what has been said about the formation of antibodies, that the first absolutely essential thing in the successful treatment of infectious conditions of the ear by vaccine is the establishment of a correct diagnosis. On more than one occasion have I heard from critics who have said that they have no use for vaccines, because they have tried them in every way, only to meet with disappointing results. Now, what has been the cause of these failures? Of course, anyone can put some pus on slant agar, heat it to 60° C., dilute it with saline, and then inject the resultant mixture into an unsuspecting patient, and probably have failure, so far as a good result on the lesion is concerned; but in the use of vaccine therapy it is just as important to establish a correct and definite diagnosis, if a good result is to be secured, as it is to be sure of one's diagnosis before beginning treatment of a heart or kidney lesion. Every man and every laboratory does not do this. For the successful treatment of these infected conditions of the auditory apparatus, one must first know what organism is doing the damage, not only as regards the morphology, by aid of the microscope, but by a thorough study of a culture, and even, if found necessary, by animal experimentaiton as well. In other words, a correct diagnosis must be made. It is not necessary in every case to employ every step of the process just specified, for in some cases the condition is self-evident.

The technic used by us is as follows: The auditory canal is first irrigated thoroughly with boric acid or saline solution, or wiped clean with cotton, and then the canal is plugged with cotton impregnated with 95 per cent alcohol, which is allowed to remain in situ for about fifteen minutes. The cotton plug is then removed, and with the aid of Siegel's otoscope the pus is removed through the perforation. In this way, the possibility of getting pure cultures is greatly aided, and we get rid of contamination from air organisms. Streak plates are then made on blood agar, and ascitic fluid agar, with the platinum needle or loop, and incubated for twenty-four hours, after which the colonies are fished and recovered on slant agar or—as is more often the case with us—on Dorset's egg media, to which a little ascitic fluid has been added. The vaccines are then prepared in the usual way from the pure cultures.

In dealing with furuncle cases we can often recover direct on egg media or agar, without preliminary plating and fishing, as there is not so much likelihood here of contamination. But in the case of subacute and chronic ears that have lasted for some time, we have found it necessary to carry out the above technic. The organisms are identified by all the means at our command, as morphology alone is quite untrustworthy in some cases. This identification by culture and, if necessary, by agglutination tests, etc., takes some days, but we have been in the habit of making up the vaccines at once and using them if organisms are found that are killed by a heat at 55° C. to 60° C. in one hour.

The process just described usually takes two days, and in order that no time be lost in attacking the disease, we give an initial dose of a pure staphylococcus aureus or albus. This is not the stock vaccine of the market, which is made of mixtures of different strains of bacteria of the same or allied species, and of uncertain strength and efficacy, but a vaccine made in our own laboratory from at least twenty to thirty strains of staphylococcus aureus, albus, or citreous, isolated at various times from a number of patients who are all suffering from a similar condition, and strains that have been freshly isolated.

When the patient returns for the next treatment, the morphologic classification has been determined as well as the cultural diagnosis made, in the majority of cases. If we find that the offending organism is one of those specified above, and corresponds to the organism of the vaccine used in the first treatment, and if there has been an alleviation of the symptoms and an improvement in the general condition of the ear, we generally continue giving the "home made" stock vaccine. If, however, the organism is of a different type, an autogenous vaccine is ready for use in this, the second treatment. In some cases where the progress of the case has not been satisfactory enough to satisfy, under the use of our own "home made" stock vaccine, an immediate beneficial effect has been obtained when the autogenous vaccine has been substituted. In brief: A scientific diagnosis is made with as much, or even more, care than is the usual physical diagnosis of disease, and it is to this fact that we attribute the success in this fairly comprehensive series of seventy-five cases, with no failure to report.

Why all this care in diagnosis and the selection of vaccine?

Because the function of the vaccine is to stimulate the system to form antibodies and opsonins which combat the disease; and inasmuch as it has been shown that a certain bacterium will produce a certain antibody or a certain opsonin, and that that antibody or opsinin will be effectual against that bacterium and against that alone, it is evident that the vaccine used must contain an antigen the same as the offending organism, otherwise no antibodies or opsonins will be formed and no result will be obtained, unless it may be a possible weakening of the system of the patient.

In Case No. 4, a polyp from the attic filled the ear, and everything was bathed in pus. The condition had lasted for a year, and the patient said that everything had been tried to cure it. The polyp was removed, and fifteen injections, ranging from 250 million to 750 million, were given. The discharge continued until three injections had been given, and then slowly dried up until after the fifteenth injection. For the last six months the ear has appeared normal.

In Case No. 10, a chronic purulent ear with a fistula, through which a probe could be passed in either direction, had lasted for seven years and had been operated upon four times, the last time four years ago. Vaccines had been used at the Army hospital, but did no good. In this case fourteen injections were given. It was a mixed infection, staphylococcus aureus and albus. The pus discharge ceased after ten injections, and the fistula closed after the fourteenth injection. This ear also has been dry for six months.

Case No. 11 was a chronic purulent case, of an indefinite number of years' duration, with radical operation, and a furuncle on the anterior wall and floor. That is a case in which, after giving the patient three injections of what we call our stock vaccines—made in our laboratory—and the progress not being as satisfactory as we thought it should be, we changed to the autogenous vaccine. The case healed up completely after the seventh injection.

Another case was sent down from up the state for a mastoid operation. The doctor up there had come to the conclusion that it was a mastoid and needed operation. We could not detect a mastoid. The patient was a girl who was pretty well along in consumption. She had a large furuncle and large glands over the mastoid which could be both seen and felt. She was given six injections of the vaccine, and kept under observation for a month, to the day, and the glands went down so that one would not know they had been enlarged. Her furuncle cleared up completely, she went back well, and her physician writes that there has been no return of the trouble in the ear, and no enlargement of the glands—even with the tuberculosis going on.

Yesterday, six other cases were discharged cured—one of the most interesting of them being a child thirteen years of age, with a diffuse furunculosis which has been in existence about a week. There had been no previous treatment, and the child suffered a tremendous amount of pain. No discharge. Three injections. The canal was completely closed by a large bladder-like collection of fluid which looked as though it might rupture at any moment. This was not opened or touched. After the third injection you would hardly know there had been anything in the ear. The condition was completely cured.

It is very interesting to note how the patients will tell us of their own accord, when they come back for further treatment, how effective the treatment is. In a large majority of the cases they say that after six to ten hours the pain ceases.

In one of the cases on the list there was a marked perichondritis which cleared up as well as the furuncular condition.

LIII.

SOME LABYRINTHINE STUDIES.*

By James A. Babbitt, M. D.,

Philadelphia.

The progress in labyrinthine study has advanced to such a degree in the present day by investigators on both this and the other side of the Atlantic, that the field of scientific work of any original character is a peculiarly difficult one. It had been the intention of the writer to carefully investigate the labyrinthine symptomatology in a series of experimental tests upon seventy-five children who are under his laryngologic and otologic care in an institution for training in speech near Philadelphia, and after securing all possible data on their unilateral and bilateral involvement of the nonacoustic labyrinth, as shown in the various nystagmus tests, to correlate this with their contemporary progress in speech development, motor and sensory acuity, memory retention, reaction time, and congenital traits. A contagious epidemic prevented the completion of this and forced the substitution of a phase of functional study approached from a rather different angle than that of custom, and in a territory which the writer's former collegiate work had given some intimacy. The holding of an institution chair enabled furthermore a rather unique opportunity for experimental observation. The difficulty of controlling experimental material, save in the emergencies of illness, is a positive one, but reasonably accurate observations were taken upon some eighty students—not all coincidently, but adequate for safe deduction. These will be discussed at more length in their proper place.

The purpose of the paper is to briefly outline certain special physiologic phases pertaining to the nonacoustic labyrinth in a study of coordination; correlate, if possible, their reflex, cross-educational and psychic influences; suggest their adaptation to the fascinating phenomena of aviation balance and seasickness; present results of functional analysis of some eighty student subjects, and draw some conclusions of suggestive import, if such be possible.

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*Read before the Section on Otology, New York Academy of Medicine, April 10, 1914.

In brief physiologic review, the cristæ ampullares of the three semicircular canals and the maculæ of the utricle and saccule in the vestibule form the end organs of the vestibular nerve which may be traced backward as the mesial root of the eighth nerve to its central nuclei on the floor of the fourth ventricle, which are, as stated by Kohnstamm, Deiter's nuclei, Bechterew's angular nucleus, the triangular nucleus close to the origin of the vagus, and the nucleus embologlossus, referred to by Braun and Friesner as intermediary between Bechterew's nucleus and the central nuclei of the cerebellum. These authorities also make the important allusion to the impulse radiation, between the nuclei of the vagus and the triangular nuclei in the fourth ventricle, as explanatory of the nausea and vomiting associated with vestibular vertigo.

Secondary tracts from the vestibular nuclei pass upward through the pons and down the anterolateral spinal tracts with fibers to the anterior cornua. Fibers to the ocular nuclei are received via the mid-brain, from the small-celled Deiter's nucleus and Bechterew's angular nucleus, and thence reflexly produce the nystagmus phenomena through oculomotor tracts.

According to Bárány, extremity reactions are produced by impulses from the double Deiter's nuclei, thence through corpus dentatum to cerebellar cortex, red nucleus of opposite tegmentum, Monakow's bundle to lateral tract of spinal cord and anterior cornua cells.

Sensory impulses pass from the cord through direct cerebellar to Gower's ascending cerebellar tract. These pass up through inferior peduncle to cerebellar nuclei and then cortex.

According to Braun and Friesner, again, in the cerebellar cortex, motor impulses from the cerebrum meet impulses from the vestibule and sensory impulses from muscles, joints, etc., which have arrived from Flechsig's and Gower's spinal tracts.

This summary has been reviewed to correlate the various ocular, muscular and vasomotor relationships. It is here to only deal with the balancing elements in the nonacoustic labyrinth, hence the lateral division of the eighth nerve will be disregarded.

Ewald states that a tonic influence over all striated muscles is exerted by the static labyrinth. This is proved by experimental extirpation, and Politzer also records subsequent modification increase in cutaneous reflexes. This tonic modification must enter as factor in the functional acuity of muscular action under variations of cerebellar integrity.

It must be admitted that other forces than the static labyrinth involve maintenance of equilibrium. Yet this would appear paramount.

Goltz maintains that the semicircular canals sense the position of the head, and from this body position is established. They determine rotation changes in rapidity and direction, thus controlling equilibrium. Variable opinion obtains as to exact function of otolith membranes; the maculæ perhaps provide orientation of the body in space, after Breuer and Mach.

In rotation the endolymph effort is to regain space relation by accommodation to movement or registering the variation. In further account must also be taken the fact that coordinated movement registers both subjective and objective sensations of movement.

Titchener, in a very careful analysis of the kinesthetic sense, describes this as motor apparatus of body, set in function by bodily movements, which enable us without eye to judge of position. The muscle sense has sometimes been described as a sixth sense, with clear definition from other special sense group, with muscle and tendon end organs: the socalled spindles of Golgi and Pacinian corpuscles or their like, in fascial tissue. The joint synovial membrane and certain periosteal areas transmit sensation of motion and, possibly, the surface of a joint is itself sensitive.

Position, resistance and weight are, perhaps, thus determined in large measure by joint sensation.

The kinesthetic organs of the inner ear which share in this motion sense are different, to the extent that they are under the influence of mechanical stimulation, the result of the wave of fluid passing over, or moving special mass areas. This is a gravitation inertia or centripetal force.

A study of the maculæ and cristæ shows them to be essentially the same in general character—a field elevated from mucous membrane—in the vestibules supporting small particles of carbonate of lime crystals, and in the cristæ ampullares supporting hair-like processes surmounted with a cupula.

According to Titchener, variation in appreciation of muscle and ear movement lies in the fact that in the first we have highly specialized end organs and no obvious group of sensations to refer them to, and in the ear a mass of complex movement sensations to distribute to available end organs.

The vestibular nerve is largely reflex in function, and by cerebellar connection contracts muscle, keeps the tone firm and tissue braced. Section produces atony, as like section elsewhere of dorsal roots.

With this regulation of muscular tone, influence on reflexes, maintenance of static tension, the decision as to definite scientific function becomes a field of wide variation.

Two phases of function, the ampullar and vestibular sense, may be identified in measure. The swimming after-sensation, secondary to rotation under various conditions, varies with the position of the head and fairly accurately follows the directions of the three semicircular dimensions. Bird experimentation, as cited by Titchener and others, indicates that this sensation, as well as the high intensity vertigo or dizziness, belongs to the cristæ of the ampullares. Injury to these cuts off tonic impulse and further originates abnormal movement which may be, of course, reflex. The four methods of producing reflex eye nystagmus—rotation, cold syringing, electric stimulation, and reflex fistula stimulation—give the primary evidence. Secondary proofs are forthcoming from pathologic, operative and postmortem findings This is specially evidenced by the findings, postmortem, on deafmutes, with whom nystagmus in over half of the subjects is practically absent.

Similar planed canals act together on both sides of the body; hence any movement of the head must produce rotation result —namely, a lagging behind of endolymph content and bending of cupula.

In complete dizziness we have a most complex situation, which must include not only the endolymph but resistance stop of soft internal components of body, joint kinesthetic sense, etc.

The function of the vestibular maculæ is still a bit uncertain, but the phenomena of the merry-go-round, deep swimming, etc., give assurance of a special coordination sense, aside from the cristæ, negatively demonstrated by their absence in deafmutes.

Perhaps acceleration, positive and negative, in body brings the maculæ into special motion, and that, in quiet, these travel with it.

The explanation of vestibular sense would seem to be in the tardiness or overshortening of otoliths in their position on the maculæ. The two maculæ represent nearly a rightangled displacement in each ear, one moving in a horizontal and the other in a sagittal plane. They are thus displaced on the principle of parallelogram of forces.

The rhythmically recurring reflex stands out strikingly as the manifestation of a really psychic factor—the cerebral education by repetition. The subconscious influence of repeated educational movements is to produce a habit of unconsciously repeating the same. The simple types of the rhythmical reflex, such as walking, the flying of birds, habit semipostural movements, up to the complicated bequest of ability to manipulate fine mechanical contrivances, the file making, Swiss watch manufacture, etc., suggest a coordinate importance from a vestibular side. According to Sherrington, the reflex discharge from nerve cells seems to be rhythmic, even under continuous stimulation. Inasmuch as our study investigates the reflex importance in the vestibular change, the rhythmical reflex may be cited as a condition modified by the labyrinth.

Volkmann, Scripture, Davis and others have studied, in considerable detail, the phenomena exhibited under cross education, in which the training of one organ of the body bilaterally develops the other side. Our tracing of the vestibular nerve and its connections, allusion having already been made to the radiation influence upon the vagus, would evidence the probability that coordinative development, assuming that such may be one of education, should have a cross significance, and that reflex and direct unilateral impress, normal or abnormal in character, should augment or counteract the effect upon its opposite side. In this connection we venture to suggest the possibility of the kinesthetic joint sense, in and around the neighborhood of the middle ear, as being a possible factor in modifying the equilibration. It is clear that fatigue or exhaustion, involving certain centers, may affect those more or less remotely distant, and a suggestive inquiry might be that of investigation of the constant unilateral use of telephonic vibrations, or, and more remotely, the constant juxtaposition in mechanical employment to machinery sounds and vibrations.

The previous analysis and allusions to the varying motor and sensory connections are cited as a background, to consider the somewhat startling applications of this paper. It is at all times a pardonable fault to place special emphasis upon utilitarian relations of important though rather common conditions. At the present moment we are deeply concerned and interested in the three important phases of locomotion—that by air, by automobile, and by sea.

The writer has taken some pains to investigate the conditions of aviation control—a long and interesting conference with a secretary of the National Aviation Society having greatly stimulated such interest. There are at hand here the records of about three hundred and twenty-five recorded aviation fatalities. This history was searched with but one object in view: to find, if possible. to what extent the loss of equilibration could be held accountable. Inasmuch as these were practically all fatal, etiology traced to postaccidental conditions present, such as a broken propeller, jammed gear, structural collapse, etc., is not sufficient explanation. To the enthusiast the possibilities of aviation are unlimitable. We can scarcely conceive the meaning of this to us within even the next decade. The query rose to your speaker's mind: "Cannot this in a measure be related to the field of the otologist?" Aviator's sickness is probably in a measure similar to mountain sickness and balloon disease. The most important effects of this are noted in the rapid phases of elevation and descent, perhaps difference in air pressure being mostly accountable. Ten thousand feet in an hour of such altitude has been reached, producing, beside breathlessness and heart acceleration, a special kind of uneasiness, which might be termed "vestibular," and which is associated with crackling and humming in the ears, burning in the face, tendency to sleep and frequently accompanying headache. Movements of the body are sluggish and unskillful: arterial tension is in a measure increased, and it is notable that all these characteristics disappear, both in maintaining a lateral plane of height and upon reaching earth, their greatest effect, secondary to ascent and descent, being noted when passing near the earth.

Omitting consideration of the cases of death, obviously due to mechanical faults in machinery and to physiologic conditions of the subject or organic character, there remain a very considerable proportion accounted for only by loss of control. These may be, of course, frequently psychic in character, as the loss of nerve, attendant upon continued strain, is a commonly cited condition among aerial performers.

Would this reasoning reach a rational explanation for many of these conditions? In a very simple experiment we have balanced upon the hind legs of the chair. We have, perhaps, practiced this to quite considerable degree. We have then found, possibly, that at some unconscious moment, with attention directed to other phases, we have been balancing quite an appreciable time without our knowledge. Like the precipitous effect of a lemon squeezed before a street band, we have noted, on occasion, the sudden loss of equilibration or coordinated control during intricate exercise, when the exhibitor's attention has been attracted by some condition in the audience, the action of another performer, or recognition of friends.

Furthermore, a study of the psychologic phases of the subconscious condition assumes in the individual, not only a perfect memory reaction when stimulated under hypnotic suggestion, but also the fact that balance, like other educated movements, becomes the result, subconsciously enacted, of repeated educational efforts for equilibrium. Jones, in his excellent treatise, demonstrates the habit of courteous social presence to be the result of repeated educational courtesy acts, finally enacted subconsciously. A musician becomes a skillful musician through repeated practice hours, on a definite routine; skilled artisans by similar methods.

The failure to demonstrate the full attainment of such grace, musical ability, or skillful craft occurs only when self-consciousness confuses the result. The marginal frame of the extraconscious is drawn upon repeatedly in conjunction with volitional act. Most of our acts are not guided by directly conscious intent. The greater group is a mass accumulation of habit impulses.

The aviator, as the balancer in the chair, educates himself to a regular rhythmical coordination, attuned to his machine. His "lift" or lightness, in a measure, might simulate the ecstatic type of lift we feel, under the influence of subordinated self-consciousness occasioned by beautiful music, superb art, stimulating odors, etc. His machine's balanced glide continues, under the influence of the subconscious accommodation of his vestibular sense to the conditions of flight. The suggestion of importance that your speaker would make here, is the possible influence of the other portion of the labyrinth—the acoustic portion. The dull, steady, monotonous vibration of the motor would tend to absorb, through reflex transference, other special sense activity. Is it not reasonable that conditions, such as are noted above, perhaps in four or five of the great flight catastrophes of this country, have called attention aside from this monotonous and consistent adaptation and introduced a self-conscious direction which has destroyed control? The query arises as to whether a deteriorating functional activity of the vestibular canals, the possible influence of a deeply thinned tympanic cavity and deficient circulation, may prove an important complement in the qualifications for safe aviation.

Seasickness has been studied by nearly every labyrinthine investigator, and in a recent publication by Byrne, based upon eight-hour trips with careful observations, he cites slight elevation in blood pressure, variations in arterial contractions and pulse rate of minor character. He makes the emphatic statement that disturbed circulation and gastric elements are not primary. Psychic imagination plays a certain part; but the sickness is absolutely analogous to the aural results on circulation and digestion, as well as the rest of the organism, caused by rotation, caloric fistula and galvanic tests. Closure of the pyloris and lowered acidity are identical with the phenomena observed in rotation due to the aural irrigation.

In reference to the third type of locomation, the automobile, as in rapid train service, it is somewhat difficult to get accurate detail as to vestibular relation. Instances have been cited in which meningeal complications have ensued from high speed locomotion. It would seem reasonable to assume that the effect of this would either be to accustom the coordinated sense to such rapidity or to produce a form of devitalizing from overstimulation. Changes in this may be those of a generation rather than brief epochs in time.

Stimulated by the interest of the foregoing observations, the writer made a series of tests, as noted in the introduction of the paper, upon some eighty students, in an effort to substantiate the correlation between vestibular reaction and certain other vital indices. The physical education field presents a certain opportunity for studying this correlation, and these tests were taken in connection with some distinctive gymnastic exercises.

First, a careful grouping was made of those men showing marked nystagmus reaction in the ordinary horizontal rotation tests. This test was taken with a Phillips rotating chair, with the head in proper position, using opaque glasses and with a two-second rotation for ten turns. The estimate of nystagmus was both upon time interval and degree of response.

In the eighty subjects six other sets of data were obtained—namely, the balancing test, a coordinated aerial test, a general gymnastic exercise rating, a grading of general mental coordinating reaction, a blood pressure test, and a pulse rating. The balancing, apparatus and coordination tests were estimated by Mr. K., the chairman of the intercollegiate gymnastic judging, and taken without knowledge of the nystagmus results. As indicated in the chart, a rather interesting set of averages was obtained.

The central dividing line indicates the general average of nystagmus duration of the eighty subjects. In the first column is put, above, the average of duration of the twenty highest subjects, and, below, represented by the dotted line, the average of the twenty lowest. The times are rather high to include full reaction, and rate above customary period in average.

In the second column, the balance tests, the results brought both groups to nearly the same spot. These balances could only be a general judgment and by a classifying decision.

In the third test—the aerial coordination—the brief duration nystagmus group stands considerably above the average line, but the high reaction group falls below.

In the general gymnastic efficiency, judged by complex apparatus standards, the lines parallel about the same, though both are below the average.

In the coordination test there was the same relative average as in the preceding.

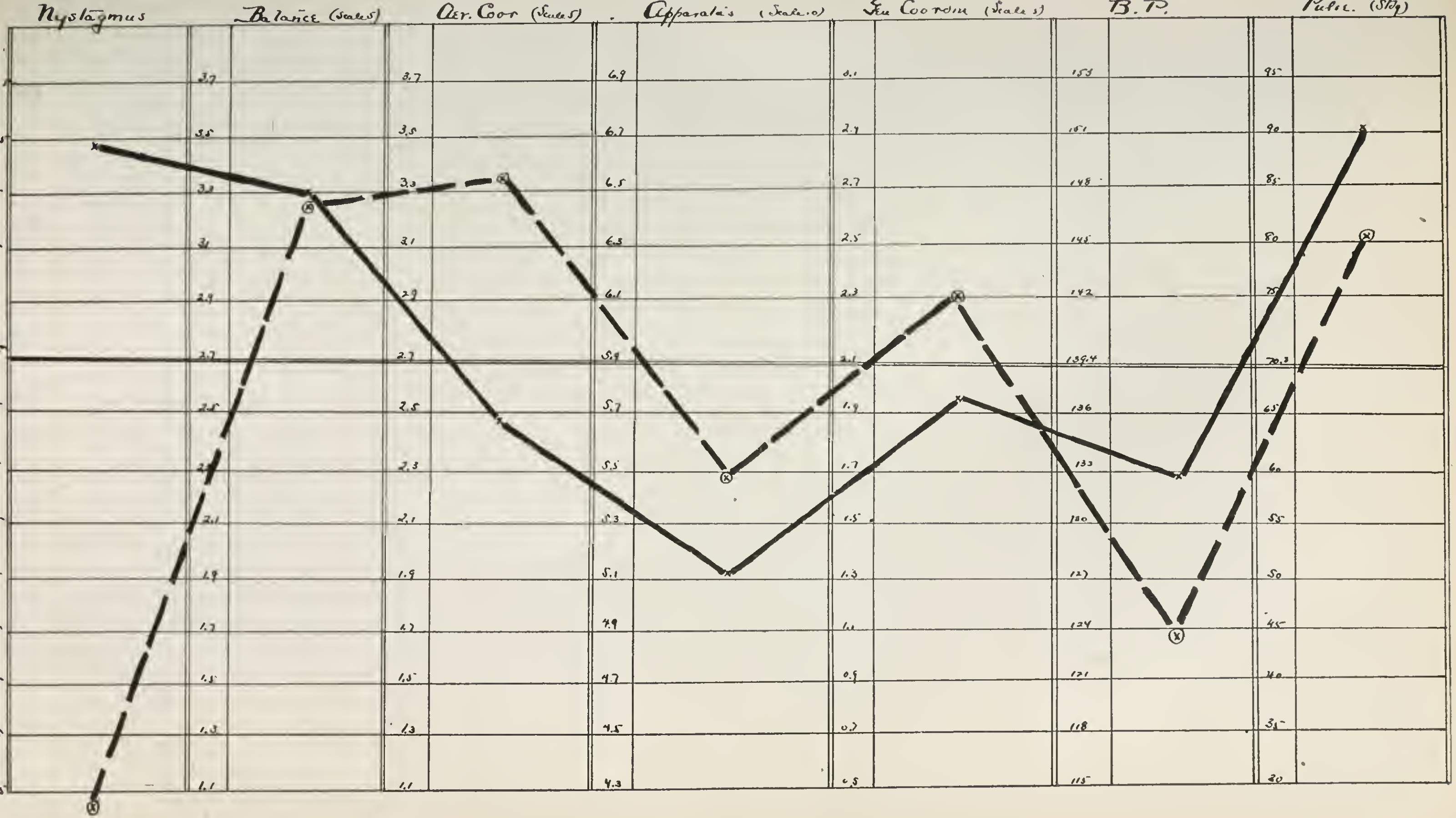
In the sixth column the lower nystagmus group ran below in blood pressure, and remained below in the pulse rating.

The averages are not in sufficient number to more than indicate; but, as an indication, they come out surprisingly in accord with our judgment, and they are freely recorded as one contribtuory series of tests.

Tersely expressed, in this series of tests an effort was made to determine several facts which might be interpreted in the form of these queries: "Is the rotational evidence in the semicircular canal in any way an index of other functional characteristic?" "Are rotational types of exercise advantageous or disadvantageous to special sense reactions?" "Is there a correlation between the nystagmus test and estimated evidence of coordinating ability, balance movement, height equilibration, etc.?" "Will the regular practice of rotations in physical development bring about a resistance to height, swift movement, and similar disturbance?" "Is there any relation between circulatory rate, blood pressure, and vestibular conditions?" "In how far does the psychic element in ordinary body movements act as a controlling feature?"

The writer would establish no conclusions from the above except as are suggested by the chart. In the group of tests taken, general coordination was distinctly higher in those who revealed the lower nystagmus after-result, and the averages of pulse and blood pressure were also below. These results are simply presented as one very minor contribution of effort in a most interesting and instructive field of work.

GENERAL CURVE OF TESTS.



LIV.

PEMPHIGUS INVOLVING PRIMARILY THE MOUTH AND THROAT, WITH REPORT OF CASES.*

By Robert Sonnenschein, M. D.,

Chicago.

Although the typical lesion of pemphigus is the vesicle, it is difficult, according to Bettmann, to apply a single term to the many forms of the disease, and he suggests that the name be used to designate pemphigus vulgaris and its most closely allied variations. This condition may be acute or chronic in its course, and is of an unknown etiology. Some claim that there is a certain connection with changes in the atrophic nerves. Hyde states that "Pemphigus is more frequently seen in males and mainly during infancy and childhood. It often occurs in debilitated individuals whose resistance has in one way or another been greatly impaired."

Since we are concerned with cases occurring primarily on the mucosa of the mouth and throat, no very extended attention will be given the discussion of the lesions usually found on the skin. On the oral mucosa and that of the upper respiratory tract, chronic forms of pemphigus are, according to Trautmann, fairly often found, but the acute cases are quite unusual, and, according to Moritz Schmidt, exceedingly rare. All of the many forms of pemphigus, such as the vulgaris, circinatus, foliaceus, gangrenosus, hemorrhagicus, serpiginatus, etc., may appear on these mucosæ.

Owing to the constant maceration and other unfavorable conditions, vesicles in the mouth or pharynx seldom reach the characteristic form seen on the skin. There soon occurs a partial or complete elevation of the epithelium before a visible vesicle is formed. There is also a more extensive fibrin formation on the mucosæ than on the skin, so that instead of a fluid exudation there is a fibrinous one. When the oral mucosa is affected by the pemphigus, circumscribed areas showing cloudy epithelium and whitish gray exudate appear, resembling somewhat diphtheritic membranes. This condition may persist for some time, or the exudate may separate in a few days, leaving sharply outlined red areas having a glazed, varnished appearance. As some of these lesions heal, others appear. In a word, pemphigus on the mucosæ shows not intact vesicles, but ragged, gray white, macerated membranes, smooth, red or granulating erosions. There may be thickening of such structures as the epiglottis, true or false cords, or at times ulcerations, which later produce scars and distortions. Moritz Schmidt says that among the latter results are adhesions between the soft palate and posterior pharyngeal wall. At times stenosis of the laryngeal orifice may ensue following contraction of the scar tissue.

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*Read before the Chicago Laryngological and Otological Society, March 17, 1914.

The pemphigus lesions may be located anywhere in the mouth and upper respiratory tract without any special predilection. As a rule, however, the process spreads from the mouth downwards into the pharynx, larynx, or even trachea and bronchi. If the pemphigus on the mucosa is extensive, very unpleasant, at times agonizing, symptoms arise, such as pains, difficulty in swallowing, salivation, fetor ex ore, etc. While practically all the various mucosæ of the body may be affected, it is the lesions in the mouth, pharynx, larynx and trachea that interest us most. The general symptoms vary greatly, but may show itching, disturbance of appetite, occasional edema, profuse diarrhea, later cachexia, and death. The latter is sometimes due to some intercurrent disease.

As regards the skin, the vesicles of pemphigus vulgaris develop, according to Bettmann, rather rapidly upon a previously normal epidermis, are usually not preceded in their appearance by any changes such as hyperemia, urticarial swelling, etc., and are devoid of an inflammatory zone. While there are often marked differences in the size of the lesions on the same patient, the form is usually very regular, namely, circular, and there is no tendency to confluence. The contents of the vesicles are usually clear at first, but if involution occurs the fluid becomes turbid, the bleb gets less tense, dries and produces crusts, the removal of which leaves for some time a reddened area and at times a brownish pigmentation. Healing results without scar formation, even if the vesicles are torn and not allowed to run the above course. At times the blebs have a bloody content, but decided hemorrhages (pemphigus hemorrhagica), or marked destruction of tissue (pemphigus ulcerosus, etc.) are rare.

The duration of the condition varies greatly from a few months in the acute forms to many years in the chronic. While no definite prognosis can be foretold in any one case, certain factors seem to influence the course of the disease. In the young the pemphigus is, as a rule, more favorable than in those of advanced age. Pemphigus foliaceus and pemphigus vegetans give an especially poor prognosis, resulting, as they usually do, in early death. Most authorities, such as Neumann, Neisser, Mickulicz and Kümmel, etc., agree that involvement of the oral mucosa (as well as the nasal) usually points to death within a few months. The primary or early appearance of pemphigus lesions in the mouth or throat is thus an indication of the malignant nature of the case.

The diagnosis of pemphigus of the mucosa is, according to Schech, difficult only when vesicles are not at the same time present on the skin. The rapid changes in the appearance of the lesions, the healing in one place with development of new areas in another spot, are, together with a history of pain in the mouth and throat, loss of weight and strength, quite characteristic. Chiari says that while it is difficult to find the actual blebs (especially in the larynx), since they often burst within fifteen minutes after formation, still one can at times find a piece of the pellicle and thus make the proper diagnosis.

In the differential diagnosis lues, herpes, and a number of other conditions must be considered. Luetic ulcers of the upper respiratory tract are deeper and have more sharply outlined edges if of a gummatous nature. Mucous patches are smooth, white, thin, show spirochetes, and have, as a rule, no red border. According to Trautmann, it is largely the history of the case, the absence of other syphilitic signs, the futility of antiluetic treatment, the presence of fever in the acute cases, the occurrence of vesicles on the skin, the superficial character of the lesions and the absence of infiltration which differentiate pemphigus on the mucosa from syphilis.

Moritz Schmidt claims that ulcerations due to the use of chromic acid in the pharynx greatly resemble pemphigus lesions.

Differentiation from leukoplakia must be made. This condition is chronic and does not change from day to day; it consists in an increase and hornification of the epithelium, not a loss of tissue or a false membrane formation.

Herpes of the mouth and aphthous stomatitis (considered by some identical) usually show smaller, round lesions, are usually very acute, often show a history of previous attacks, and do not, as a rule, seriously affect the general health.

Last, but not least, one must remember diphtheritic involvement of the mouth or pharynx. This condition produces the grayish, adherent, characteristic membranes, shows the Klebs-Loeffler bacillus, runs a very acute course, and is usually at once favorably influenced by the antitoxin.

The treatment of pemphigus in general is very unsatisfactory. Arsenic has been largely used, and recently salvarsan has been tried. For the lesions in the mouth and throat mild cleansing and disinfecting washes containing hydrogen peroxid, etc., are indicated. At times astringents or preparations such as silver nitrate, tincture of iodin, etc., may be applied.

Case 1.—For the notes as well as the permission to report this case I am deeply indebted to the kindness of Dr. George Rubin, whose patient she was. Mrs. L. S., aged sixty-two years, housewife, Russian Jewish, entered Maimonides Hospital, October 28, 1913. Family and previous personal history unimportant.

Present Condition.—The symptoms complained of began about eight weeks prior to her admission into the hospital, and two days after she had undergone some dental work. There first appeared a small, socalled "pimple" near the right angle of the mouth on the inner side of the lower lip. In a day or two there were several lesions in the mouth. These were followed by a few blisters the size of a half pea on the abdomen near the groin, and later on the arms. The diagnosis of pemphigus was confirmed by Drs. Joseph Zeisler and Joseph S. Eisenstaedt. The time between the occurrence of the lesions in the mouth and other parts of the body was not definitely noticed by the patient. Similar blebs developed rapidly on the feet, especially on or near the toes. Some vesicles were as big as a half cherry, and some even larger; they would burst, form crusts and some would weep. The temperature at first ranged about normal, but later rose at times to 100° or 101°, but never reached 102°. The eruption continued in the mouth throughout the illness. Three weeks prior to death the larynx became involved, showing patches with exudate and producing aphonia. The latter condition lasted a few days, then the patches partially healed, and the voice became clearer and stronger. The eyes were also seriously involved towards the end. The blood, urine and other excreta were normal. Cultures of the secretion from the blebs gave almost a pure culture of staphylococcus. Two salvarsan injections were given about the middle of the course of the disease, but without any apparent influence. Death occurred within six months of the onset of the disease.

Case 2 was seen by the writer. Mrs. H., aged thirty-eight years, American, housewife, was referred by Dr. A. H. Fowler, October 19, 1911. Before and during her last pregnancy, two and a half years previously, the patient had "nervous exhaustion" and a severe nephritis; following labor there was a phlebitis. Eight weeks before seeing her she began to have pain in the throat, especially on the right side. Had a prickling sensation, particularly when eating ice cream. About the middle week of October blood was on several occasions expectorated.

Examination showed a rather frail, pale woman, with hemoglobin of eighty per cent. The nose was negative except for a few small erosions in the anterior part of the septum. The gums seemed to be the seat of a marked pyorrhea alveolaris. The nasopharynx was negative, but the oropharynx showed a number of patches with red zones covered by a white rather ragged exudate which could be fairly easily removed with cotton applicator, leaving an eroded area. No actual vesicles could be seen. Smears from the false membranes showed various diplococci and bacilli, but no spirilla. The salivary glands and many of the cervical lymph glands were enlarged.

The Wassermann test, made by Dr. F. G. Harris, was negative. Silver nitrate (five per cent), tincture of iodin and potassium chlorate mouth wash were at various times used. Owing to the pyorrhea, the patient was referred to a dentist and the gums treated. The latter as well as the pharynx showed marked changes in condition; on certain days there was apparently great improvement, with healing of many of the lesions, but a few days later numerous other ones would appear. Drs. W. A. Pusey and A. W. Stillians diagnosed pemphigus, even though no vesicles had as yet appeared on the skin.

Towards the end of November, 1911, white patches similar to those seen in the pharynx appeared on the epiglottis, false cords and posterior laryngeal wall. The true cords were injected and hoarseness was present. January, 1912, the intestinal mucosa apparently became involved, as evidenced by pain, distress, diarrhea, etc. Then vesicles appeared on the skin, the patient became much emaciated and died, February, 1912, six months after the onset of the disease.

SUMMARY.

Both of the cases cited began in the mouth, the writer's case showing more intense and more diffuse lesions extending from the lips into the trachea, and probably into the gastrointestinal tract. In this case there was a distinct history of nervous exhaustion, nephritis and phlebitis following pregnancy two and a half years previously. Both cases died within about six months after the first lesion appeared in the mouth.

CONCLUSIONS.

1. Acute pemphigus is of rather unusual occurrence.
2. The early appearance of lesions in the mouth and throat gives an exceedingly poor prognosis.
3. Treatment is of little avail in either acute or chronic cases, the former usually dying within a comparatively few months.
4. In the differential diagnosis quite a number of commonly seen diseases must be considered.

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SOCIETY PROCEEDINGS.

REPORT OF THE SCIENTIFIC PROCEEDINGS OF THE THIRTY-SIXTH ANNUAL CONGRESS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

Held in Atlantic City, May 25-27, 1914.

Address of the President—The Air We Breathe.

By Thomas Hubbard, M. D.,

Toledo.

During the period 1825 to 1875 the standard of temperature of dwellings and public places was gradually increased from 55 degrees F. to 72 degrees F. There was no attempt at corresponding increase of humidity. Fifty-five degrees with natural ventilation implies about 40 degrees relative humidity; 72 degrees F. gives a natural humidity of 20 per cent or lower. From the health point of view the 20 per cent decrease in humidity is more important than the 15 degrees rise of temperature.

Catarrhal and acute infections are more prevalent during the cold months to a degree not creditable. Abnormal dryness of the air of our habitations is a factor worthy the attention of hygienists. Dry air is a dust ladened air—and an infection disseminator. Moist air causes precipitation of dust content, and a proper humidity lessens dangers of air borne infections.

The caloric shock of sudden change from 70 degrees and 20 per cent relative humidity to outdoor air 30 degrees, 80 per cent relative humidity (average winter condition), causes chronic congestion and inflammatory reaction in air passages. Chronic pathologic changes in mucosa and turbinates follow. Unhealthful atmosphere of our habitations is the ever present etiologic factor in winter catarrh.

The difficulty of humidification lies in the high temperature standard. Almost impossible to moisten air up to 50 per cent relative humidity and at the same time ventilate. Problem simplified at 65 degrees with 40 per cent relative humidity. Sixty-five degrees F. with 40 per cent relative humidity feels as comfortable as 72 degrees F. with minus 20 per cent relative humidity. Sixty-five degrees F. is the "critical point" in heating air. Fuel cost increases very rapidly above that. There is a positive natural resistance above 65 degrees. To heat air from 60 degrees F. to 70 degrees F. costs as much in fuel as to heat it from 20 degrees F. to 60 degrees F.

Sixty-five degrees F. is the natural temperature standard for habitations. In so far as we are habituated to a temperature above that, we are that much hypersensitized to temperature, and consequently more subject to caloric shock—and further, health and economy unite in demanding a revision of heat standard downward, in order that a healthful humidity standard, 40 to 50 per cent, may be made practical.

Ventilation is important, but there is such a thing as too much ventilation. When air of dessicating, unhealthful quality is introduced in volume sufficient to change the air of a building two to four times an hour (the minimum rate to get proper distribution of heat), it is virtually a dry kiln effect, and the more rapid the change the lower the humidity. For example: Furnace heated school rooms are gradually brought down to considerably below 20 degrees relative humidity (14 per cent in one test), and no amount of socalled "fresh air" without artificial addition of moisture can offset the deleterious effect of the abnormal dryness.

The average winter relative humidity of the North Atlantic and Middle States is near 80 per cent. This condition makes it all the more important that we give special attention to "conditioning" the air we breathe up to a tonic healthful degree of humidity.

Engineers and architects are prepared to meet any reasonable demand, and it is our duty to aid in educating toward establishing proper heat and humidity standards.

DISCUSSION.

Dr. Joseph H. Bryan, Washington: Physicians postpone taking up this very interesting subject, contenting themselves with treating the pathologic conditions that take place in the upper air passages resulting from vitiated air, rather than educating their patients how to live in an atmosphere that is not only comfortable but healthful.

I agree with Dr. Hubbard as regards the temperature of our living rooms; 65 degrees seems to me the maximum—anything above that increases the sensitiveness of the individual. It is a notorious fact that we in America indulge in too much heat in our homes. The only other nation that lives in such hot houses is the Russian. Foreigners coming to this country to live for the first time almost universally complain of the great heat of our houses. Humidity and temperature are so intimately connected that they cannot be considered separately. As Dr. Hubbard says, a temperature of 65 degrees with a humidity of 40 degrees will be as comfortable as a temperature of 72 degrees with a humidity of 20 per cent. These are simply opinions, and must be verified by more extensive observations before they can be accepted as a standard for the sanitary engineers to go upon in supplying our homes and public halls with the proper atmosphere.

How are we to arrive at the proper conditioning of the air we breathe so as to produce an atmosphere that is conducive to health? It can only be done by the medical profession joining forces with the sanitary engineer. The engineer is prepared by the many devices at his command to produce any kind of air that is desired. He, however, has not been able to bring about the desired results because there is no uniformity of opinion in the medical profession as to what kind of air is the best for the health of the individual. We have been too slow to take up and investigate this most important subject. When this is done and a uniform opinion formed, there then remains for us the all important duty of educating our patients how to live in a healthful atmosphere.

Dr. John F. Barnhill, Indianapolis: We all see this class of case, namely, one which cannot endure a temperature below 70 degrees without great distress. These cases have been, in my practice, usually those of ethmoiditis; when they go into a lower temperature and are inactive, they will have fits of sneezing, watery discharge, discomfort, cold feet, and distress in general. For a long time when I saw that class of case I thought possibly there was something psychic about it, and tried to dissuade them from their feeling that high temperature was the proper thing. About two years ago I began to have the same condition myself. When I would sit in a room less than 70 degrees I began to sneeze, had discomfort and all the symptoms which I have just related. I could not sleep in a room where the temperature was less than 65 degrees without waking in the morning with great distress. On examination by a rhinologist I found I had small polypi and a beginning ethmoiditis, and when these were cured I could again live in a lower temperature without discomfort.

Dr. Henry L. Swain, New Haven: I would like to put a question to Dr. Hubbard. I do not understand which method he recommended for bringing up the humidity of any given house or room to a desirable state. It must be that what he says is true, because if we are stimulating the physiologic functioning of our nasal mucosa from both outside and inside, moistening the air to our lungs, we must be making a physical stimulus sufficient to produce an hypertrophy to intensify any tendency to hypertrophy in such a nose.

Dr. Charles W. Richardson, Washington: Some years ago I talked to the chief of the Weather Bureau, and he brought to my consideration the question of increasing the humidity and lowering the temperature as being the most comfortable for living purposes. He explained it so thoroughly and satisfactorily that ever since then I have been having my waiting room uniformly at 60 degrees with 40 per cent humidity. There is one thing in that connection I would like explained. It has been a question with me whether I should not increase the temperature a little, for I find that most of my patients, or at any rate a number of them, speak of the coldness of my hands. I feel perfectly comfortable, not at all cold. I never have any affection of the upper air tract. I think another interesting point brought out is the cry of nature against this lowered humidity and high temperature. I have always had a hobby for old furniture, and, as you know, a great deal of that is not nailed but riveted with wood and glue; and I have often noticed when our temperature was high how we could hear it crack and warp. The joints would open up. But since we have been keeping the temperature lower and the humidity higher this crackling has ceased.

Dr. Emil Mayer, New York City: I would like to ask a question of Dr. Richardson. What effect do your patients find in coming into a room kept at 60 degrees when they are not accustomed to it?

Dr. Richardson: Some complain about it, I must confess.

Dr. Thomas Hubbard, Toledo (in closing): In regard to Dr. Bryan's conclusions that 40 per cent to 60 per cent relative humidity is the healthful standard, I think most engineers believe that anything above 50 per cent is impracticable, especially with regard to the question of condensation of moisture on windows and in cold weather the frosting, which must be taken into consideration. It should also be mentioned that when the occupants are undergoing physical exercise they can stand only from 45 per cent to 50 per cent; when engaged in a sedentary occupation they can stand more. The discomfort of foreigners is really due to the change in humidity, not to the temperature. I want to emphasize the indirect system of ventilation which is largely responsible for the changes in the humidity; the colder the weather the less moisture in the atmosphere or fresh air you take into the furnace, and the more rapid the change in the air of the house the more rapid is the lowering of the standard of humidity. The modern system is a combination of direct and indirect—direct for the heat of the room, and indirect for a moderately rapid change of air or temperature of the room.

With reference to Dr. Richardson's statements, I would consider that 60 degrees is too radical a change for most of us, because we are so accustomed to 70 degrees, even with a humidity of 50 per cent. Ultimately we will regard 60 degrees as a standard to be obtained, just as now we consider 65 degrees, but at present it is too sudden a drop for most people from 70 to 60 degrees, and there would be more or less positive physical discomfort.

Primary Lupus of the Larynx.

By Emil Mayer, M. D.,

New York City.

Three cases of lupus of the larynx, two of them primary, had been under the writer's care during the past year.

As he had presented this same subject seventeen years previously to this Association, opportunity was afforded for a comparison with the viewpoint then existing, as also of noting the progress made in the diagnosis and treatment of this affection.

The total number of cases of primary lupus of the larynx recorded in the literature up to the present time, including the two here presented, was thirty-five, indicating the rarity of this affection, which was first described by Ziemssen in 1876.

It was perhaps noteworthy that the two cases presented by the writer in his former communication were of primary lupus of the larynx in their earliest stages, and were observed for many years; while the two here presented were in the later stage of the disease.

Lupus of the larynx is a chronic disease with but the slightest symptoms, is often accidentally discovered, and the prognosis as to life is relatively good.

The distinctive appellation of lupus should be maintained; primary lupus of the larynx, though rare, does exist.

DISCUSSION.

Dr. J. Payson Clark, Boston: The case which I saw recently is very interesting—that of a young woman, twenty-four years of age, who was sent to me by a skin specialist. She first discovered, somewhat over a year ago, a small red spot on the left cheek, just about the angle of the mouth; she showed it to a local physician, who made light of it, so she forgot it; but last fall it had increased somewhat in size, so she went to a dermatologist in Boston. He was not able to make a diagnosis, but kept it under observation until early in February, when he decided it was lupus. Then a little later she was a little hoarse, and he thought there might be some lupus of the throat, so sent her to me. I discovered on the left side of the posterior wall of the pharynx, and involving the left posterior pillar, a pale nodular mass which had all the typical appearances of lupus. On examination of the larynx I found the epiglottis swollen, pale and nodular, and this same condition extended down to the aryepiglottic fold, and the arytenoids were somewhat enlarged. This patient was apparently in perfect health, well developed, of splendid color; lungs examined and give no sign of any trouble. What am I going to do with this case? Of course, if this condition existed only in the spot in the pharynx, I could curette it and cauterize it thoroughly, but I do not feel that by removing the epiglottis I will cure the trouble, because if you see an epiglottis infiltrated in that manner, you will know that the process microscopically has probably extended considerably further, and if you remove the epiglottis you will have no surety of removing the whole disease. Probably the aryepiglottis and arytenoids are also affected.

Dr. William E. Casselberry, Chicago: I was about to ask Dr. Mayer if he would not, in closing the discussion, go a little more into detail with respect to the first case. I do not doubt the correctness of his diagnosis, but I feel I would have made a mistake and called this tuberculosis of the larynx. In a man with advanced pulmonary tuberculosis, with cavities, etc., and with enlargement of the layrnx and nodular enlargement of the epiglottis, even though not associated with much pain, I am sure that I have seen just such cases in both advanced and incipient tuberculosis, which I have included in my cases of tuberculosis of the larynx. I know that there is a clinical distinction between lupus and tuberculosis, both with respect to the skin and the mucous membrane, and I do not doubt that we can have the two conditions combined, just as Dr. Mayer has led us to infer was the case in his patient.

Dr. Henry L. Swain, New Haven: I would like to ask Dr. Mayer what has been the result in these cases, of tuberculin used along modern methods, as in cases of tuberculous laryngitis? In speaking of the marked benefits from superheated air, do you use the suspension laryngoscope?

Dr. Herbert Birkett, Montreal: Some years ago I reported before this Association a case of primary lupus of the pharynx, and at the same time mentioned a case of lupus of the nose which was found only accidentally to have involved the larynx. These conditions were definitely found to be lupus, first from the presence of the bacillus, secondly from the local definite reactions to tuberculin, and finally from the transmission of the disease to guinea pigs. The lungs in both cases were absolutely negative, for the use of tuberculin would have awakened any latent focus had any existed. The treatment instituted in both cases was the X-ray. In spite of the local treatment which I had carried out, it had resisted treatment until the X-ray was used, which was accomplished by means of a lead tube dropped into the pharynx and down to the larynx, allowing of direct application. Both cases got absolutely well.

Recently, within the past six months, I have seen two cases of primary lupus of the nose, both of which have made complete recoveries under radium. In one case the specimen was definitely pronounced by the pathologist to be carcinoma; this was very curious, for two specimens were sent to the pathologist at different times, without his knowing they came from the same patient, and he returned the same diagnosis for each. The physician in charge of the X-ray department, Dr. Perry, pronounced them locally to be cases of lupus.

Dr. Emil Mayer, New York City (in closing): Regarding the diagnosis in the first case: The man was brought to me by his physician, who was a very good observer, with the very thoroughly elicited history of having a complaint of only seven weeks' duration. His story was that over four years ago he had a cough, for which he was treated, and then remained well, and yet at the time of examination there was this tremendous infiltration and destruction in his larynx; a condition which must have been of very long duration and for which this man had absolutely no complaint. It seemed to me from the nodular excrescences, the absence of all previous bad conditions, together with the absence of dysphagia and its slow process, for it was discovered only when the tuberculosis of the lung had become apparent, because the man had been in such surroundings that his history would have been brought out quite early if he had anything of the sort, that it was entirely proper to place this case solely in the catalogue of late appearance of lupus of the larynx, beginning there and eventuating in the lung. And as the second case was without lung involvement and no great infiltration and destruction had occurred, I felt justified in putting both in the same category. It is possible that this is one of the cases we meet when we investigate cases of arrested tuberculosis. The point has been brought out by Dr. Birkett and Dr. Clark, that lupus of the larynx is an accidental discovery.

I would say, as regards tuberculin treatment, it has been used extensively, particularly by Blumenthal, Edmund Meyer, and others, and they extol it very much, used carefully and in the manner indicated. The old tuberculin is used in all instances, the new tuberculin not being used because of the danger of edema.

Superheated air is claimed to have good results by laryngofissure, and it was one of the methods of treatment which was suggested, using the Killian suspension apparatus.

As regards the helplessness of our treatment, it does seem rather peculiar to speak of the treatment of a disease of slow progress which causes the patient little or no discomfort. As regards any treatment which is instituted—and we may have to go from X-ray, radium, superheated air to this new method of Pfannenstill, of the direct effect of iodin—the whole endeavor should be to inhibit as far as possible the insidious progress of this disease.

Primary Sarcoma of the Trachea.

By J. M. Ingersoll, M. D.,

Cleveland.

A case of sarcoma of the trachea in a man, thirty-two years old. The patient had a persistent, troublesome cough for several months, and during this time he had had three very severe prolonged attacks of paroxysmal coughing. In each of these attacks he had finally coughed up and expectorated what he called a "polyp." He corroborated this statement by showing me the polypi which he had expectorated. They were irregular, slightly nodular masses. The smallest one was about 1.5 centimeters in diameter, and the largest one was 3 centimeters long and 1 centimeter thick, tapering down to a small pedicle at one end.

His larynx was inflamed, and on the left side of the trachea, just below the first ring, there was a pedunculated tumor, quite similar in appearance to the largest one which the patient had expectorated. At this time there were no indications of any involvement of the tissue around the larynx and trachea.

Microscopic examination of the tumors showed them to be spindle celled sarcoma. External operation was refused at the time by the patient, and later, when he consented, the growth had already extended beyond the larynx and was inoperable. Thirteen weeks later the patient died; no autopsy was permitted.

DISCUSSION.

Dr. D. Bryson Delavan, New York City: The question of malignant disease of the trachea is especially interesting because of its hopelessness. I have seen a number of cases of malignant disease and of nonmalignant growths of the larynx treated by means of radium in the hands of at least one of the most expert users of radium in the world, and he found it extremely difficult to make the proper exposures of the radium to the growth. If that be the case in the larynx, the difficulties in the trachea are increased, even though the applications be made through an incision in the trachea. The use of the X-ray, while palliative and beneficial to a certain extent, we admit is powerless to cure certain types of growth. That brings us back to the chemical treatment of malignant disease. In the case of malignant disease of the trachea, some combination of remedies worked out in the future is to be the sovereign resource, rather than surgery.

Dr. Chevalier Jackson, Pittsburgh: I think we are indebted to Dr. Ingersoll for reporting this case, because of the very great rarity of this affection, if we exclude from consideration the malignancy of the trachea which is an extension downward from the larynx or upward or inward from the mediastinum. In my own experience I can recall but a single case, and even here I cannot be sure it was primary in the trachea. I have seen a large number of cases of malignant disease of the trachea, but always as an extension. There was one case where we felt justified in considering it was primary.

I also agree with Dr. Delavan in the hopeless outlook. I cannot imagine the possibility of the cure of even a very small primary malignancy in the trachea, when we consider the fact that it occurs, as Dr. Ingersoll says, on the posterior wall, which we know to be full of lymphatics; and the lymphatic leakage is extremely prompt. It is a very different situation anatomically from a small intrinsic malignancy located in the larynx. When it gets to the posterior wall in the larynx, it is truly hopeless of cure because of the lymphatic leakage.

I hope also for the discovery of some therapeutic or chemical cure. I question whether radium is going to accomplish very much in malignancy in this position. I have seen it used with remarkable results in sarcoma of the larynx, which nearly a year later developed an unquestioned squamous celled epithelioma on the site of the cured sarcoma. Was this a coincidence or due to the use of radium?

Dr. John M. Ingersoll, Cleveland (in closing): I have found as yet nothing which offers as much hope of recovery as an early operation, if the condition can be gotten before it has extended beyond the trachea; in such instances it seems to me the hope of possible recovery is something like, but not as good as, in intrinsic malignancy of the larynx.

Studies Regarding Anaphylactic Reactions Occurring in Horse Asthma and Allied Conditions.

By J. L. Goodale, M. D.,

Boston.

Dr. Goodale reviewed briefly the literature relating to anaphylactic reactions following the administration of antitoxic sera, and reported a series of cases of vasomotor disturbances of the upper air passages which were examined in regard to their reactions following the local application of horse serum to the abraded skin and the nasal mucous membrane.

SUMMARY OF CASES.

In five patients with horse asthma, the application of horse serum to an abrasion of the skin produced within a few minutes sharply localized edema and reddening. In three of these cases the introduction of horse serum in the nose caused edema of the nasal mucous membrane, together with profuse watery discharge and sneezing.

One case of horse fever without asthma gave a delayed reaction to the nasal test, but was negative for the skin test. A similar case gave a delayed but definite reaction to the skin test, but showed no nasal symptoms. Four of the horse fever cases without asthma were negative for both tests. In two cases, the sister who had horse asthma reacted markedly to both tests, while the brother, whose vasomotor symptoms from horses affected the nose alone, showed no reaction.

Six cases of bronchial asthma and five cases of hay fever were negative for both tests.

Three cases without vasomotor symptoms which had received immunizing doses of antitoxin several months previously showed no reaction to the tests.

The results of these experiments indicate that a localized anaphylactic reaction from horse serum may be occasioned in certain individuals who experience asthmatic disturbances from the neighborhood of horses. The severity of these vasomotor symptoms appears to be a determining factor in the production of the reaction, since persons with nasal symptoms alone do not appear to be sufficiently sensitized to horses to give a positive skin test.

The suggestion was made that a preliminary skin test with horse serum be made in all patients who have previously received an injection of antitoxin derived from horses, whether tetanus, diphtheria, or plague serum. Furthermore, in all patients who are about to receive antitoxin for the first time, inquiry should be made as to whether they have ever been disturbed by asthmatic symptoms when in the neighborhood of horses, and if so they should first be tested.

So far as these experiments go, they would indicate that in horse asthma a dangerous anaphylactic shock may occur after the hypodermic administration of horse serum. In horse fever with nasal symptoms alone, this danger is less or not at all to be feared, and in other types of asthma and of vasomotor rhinitis it is not present.

DISCUSSION.

DR. BURT R. SHURLY, Detroit: Dr. Vaughan has certainly elaborated one of the most scientific and most practical theories in regard to sensitization and anaphylaxis that has yet been brought before the scientific world, and the remarkable point of it all is that by injecting ordinary egg albumin solution in repeated doses the guinea pig dies in all the phases of severe surgical shock. And the point which was not brought out in the paper, is that it is exceedingly dangerous to inject any antitoxin after the ninth or tenth day from the initial dose. It was my pleasure many years ago to do the experimental work on the diphtheria antitoxins which were brought out by a large manufacturing house before they were put on the market, and we had occasion in a large diphtheria service for the first time to observe the very varying effectis of antitoxin upon patients, and the very great difference in these effects according to the manufactured product. The product of some laboratories is exceedingly high in cutaneous reaction, erythema, urticaria, and these manifestations of anaphylaxis are decidedly at variance, according to the method of manufacture. So that of course the modern methods have greatly eliminated the dangers of sensitization where the reaction is decidedly less. Those of us who have met with an example of what it means to see a death in three to five minutes after the injection of antitoxin, certainly carry with us through life a most profound feeling of the very great danger which antitoxin may manifest, and yet in an enormous experience in our own city we have had but one fatal case after antitoxin administration. This was in a man of forty-five years, whom I was called upon to do a tracheotomy for, but who had the anaphylactic symptoms inside of three minutes; in about five minutes he was dead. There was no history obtainable of a previous dose of antitoxin having been administered. But the very great danger comes in administering a dose after the ninth day; and it seems we have certain definite lessons to learn in the fact that we use horse serum to control hemorrhage, and we use the various kinds of antitoxin in our special line of work, and we should have these definite things well in mind. For some reason sensitization increases in a most marvelous way after the ninth or tenth day, and you will remember that the cutaneous eruption which occurs after antitoxin is amost always to be found on the ninth day. Therefore, whenever I give diphtheria antitoxin to anybody, I always tell them not to be afraid of developing scarlet fever or measles should this rash appear, as it probably will, on the ninth day. Another very definite thing which we should always have in mind before administering an antitoxin is to inquire if the patient is asthmatic or already using antitoxin.

Again, the use of the adrenalin glands are undoubtedly very greatly the source of many of these disturbances of sensitization, as shown by Sajous in his elaborate scientific investigations.

Dr. Hanau W. Loeb, St. Louis: I should like to mention an experiment which I once saw which brought this matter of sensitization before my mind most convincingly. I could understand how if an animal was sensitized to any agent, being again injected he would die, but in Dunbar's laboratory he made another experiment which was far more convincing. The sensitized animal died in three or four minutes; then he took the urine of that animal and injected it into an unsensitized animal, and that one died in a shorter time, showing the production of a deadly poisonous substance produced in but a few minutes.

Dr. J. Payson Clark, Boston: I had the good fortune to run across what to me was a most marked case of horse asthma in a young man of nineteen years, who said that he had had asthma from the age of three to ten years, and was cured by going to the southern pines, and then by an osteopath. Also, when he was a child he could not eat eggs without a sense of constriction in throat and blotches on his skin. For three or four years now, since he was fifteen years of age, he can eat eggs, but if he eats them raw he has a gagging sensation in his throat. As long as he can remember, he has been very sensitive to a horse or cat. Riding behind a horse brings on an asthma for which he has to go to bed—oppression in the chest, and all the symptoms of a severe asthmatic attack; at the same time he has sneezing and a watery discharge. The cat causes only nasal symptoms. On examination I found the septum deviated and the right and lower turbinals swollen; mucous membrane bathed in watery secretion. I thought I would try Dr. Goodale's skin reaction; I did not get it, whether due to my faulty technic or not, I do not know. Then I thought I would try by hypodermic doses of horse serum, beginning with a minute dose. I prepared a solution by mixing the horse serum with normal salt solution into which I put .05 per cent of phenol; on the first day I also applied some adrenalin to his nose to see what the reaction would be, and gave him a spray of camphor, menthol and albolen. On May 1st I gave him 1/1000 of 1 cc., with no reaction; on May 2nd. 1/1000 of 1 cc., with no reaction; I then intended to increase the dose to 1/10 of 1 cc., then to 1 cc., in successive days, until I obtained a reaction, but on May 4th he told me his mother did not wish him to have any more. He was perfectly willing. I then gave him one-fifth of one per cent solution to use in his nose as a spray. He had been completely incapacitated for work because any dust made him sneeze. His father telephoned to me the day before I left Boston to attend this meeting that his son did not sneeze at all any more and considered himself cured, and was going to take a position the following day.

Dr. Henry L. Swain, New Haven: I have seen one patient so near death this winter that I tremble to think how close to the brink he was. Now, if from such work as Dr. Goodale presents there is a method which we will be able to use as a test, we are certainly adding to the list of possibilities when the need of antitoxin comes up.

Is there any reaction in normal subjects?

Dr. William E. Casselberry, Chicago: In Dr. Goodale's report he differentiates horse asthma from the general asthma class; the horse asthma patients will react to the serum, and these patients are subject to immunization by means of the serum. We find many of our patients are a mixed form, suffering from horse asthma as well as other asthmas. In connection with Dr. Goodale's patient, who was an equestrienne and who reacted so favorably to the immunization with the horse serum, did she have asthma in other directions, and did this other asthma show equal immunization?

DR. GEORGE E. SHAMBAUGH, Chicago: I would call attention to anaphylactic reactions following the eating of certain fruits. I remember the case in my own family of an individual who had the phenomenon that her eyes would swell shut and the edema would extend to the conjunctiva and was associated with some sneezing. She at times had had slight asthma. We did not know what the condition was caused by, and yet I had seen several cases where edema of the larynx had followed the eating of grape fruit. When I noticed that, I observed in my own family that whenever grape fruit was eaten by this individual it would produce edema of the eyes, and so this fruit was cut out of her diet and the phenomenon disappeared; it has now been some time since she has had such an attack, and strange to say she can now eat grape fruit with impunity.

I saw a case in the last few years where the patient had frequent attacks during the winter of anaphylaxis, with very pronounced swelling of the eyes, puffiness of the face, coryza and discomfort. She lived quite a distance from me, and I never had a chance to see her during the attack, as she was very sensitive regarding her appearance. I examined her very carefully, and there was what seemed to me some evidence of hypertrophic ethmoiditis on one side; the symptoms were so annoying to her that I removed the anterior part of the middle turbinate to give her relief. The phenomenon continued at intervals; it apparently came on as a bacterial infection, and I was convinced later that it came from the tonsils, which I removed a year ago, and she has had no attack since. If I may judge from the results, the infection took place in the crypts of the tonsils, starting an anaphylactic reaction.

DR. JOSEPH L. GOODALE, Boston (in closing): There is no reaction in normal patients. There were three subjects having antitoxin last October in a small epidemic, and the death of one of the boys brought this matter to my attention. The cases which had had previous antitoxin, especially cases of horse fevers, showed no reaction. In the first place. the one case of mild horse asthma with fever complained of a lot of sneezing and a little constriction, and developed the reaction forty-five minutes after the dose. So that we have very marked differences in the promptness with which these reactions appear. With regard to Dr. Shurly's statement, that the ninth day is the one when skin reactions are usually found, I find this varies markedly. The von Pirquet has shown this difference in rapidity of reactions after a full dose. They may appear in a few minutes, a few days, and the ninth day is usually the crisis at which the accomplishment of the storing of the zymogen reaches its maximum.

Replying to Dr. Casselberry's query, my first patient lives on a farm which she manages, and it is therefore a little difficult to separate the influence of horses from other influences. But I believe there are two types of asthma in this case, because I have on occasion made her leave the vicinity of the horses, during which times she was greatly improved; nevertheless, she still had some asthmatic symptoms. Since the removal of her tonsils four years ago she has been freer from continuous asthma, and the type is not simultaneous with increase in the edema of the ethmoid, but with the neighborhood of horses. It seems actually now as though she would have more comfort this summer than ever before.

Environmental Surgery of Otolaryngology.

By John F. Barnhill, M. D.,

Indianapolis.

In the early history of the practice of otolaryngology the field was a very limited one. The belief seems to have been that the nostrils constituted the nose, the tympanic cavity and eustachian tube the ear, and the structures outside the larynx were not included in the domain of laryngology.

As knowledge concerning the accessory sinuses of the nose and ear, and of the lymphatic system, the cranial nerves and their ganglia accumulated, the field of work of the specialist of this class of necessity widened until at present any limitation which does not include the diseases of the entire head and neck would be unwise. That the entire field of the surgery of the head and neck lies within the domain of the otolaryngologic surgeon should now be conceded by all. It is not advocated, however, that all who limit their practice to diseases of the ear, nose and throat should undertake the many difficult and often capital operations necessary about the head and neck. Only a small percentage perhaps would feel sufficiently qualified to do so. It is advocated, therefore, that a cleavage in the ranks should take place, and that those who are nonsurgically inclined, and those whose surgical opportunities have been small, should limit their work to the therapeutic and local treatment of nasal and aural diseases, while those whose opportunities in surgery have been ample, and who are willing to devote their entire time to anatomic study and surgical progress, should undertake the difficult surgical problems of the upper air tract and its entire environment. Such an arrangement would be best for the patient, because it would save him from operation by those often little qualified to do surgery. It would insure better therapeutic measures on the part of those whose practice is not burdened by important surgical cases, it would free the real surgeon from the burdens of a large routine office grind, and would thus enable him to devote his entire time to the surgery of the most complicated region of the body.

DISCUSSION.

Dr. D. Bryson Delavan, New York City: This is a most burning subject, and has been one ever since the surgery of the larynx came into vogue. It bears out my own experience and that of all other laryngologists who have had to deal with operative laryngeal cases. The wife of a prominent officer, a splendid lady in early middle life, had a little papillomatous growth which Dr. Knight and I observed for two years, after which time she developed symptoms of malignancy, was operated on by a most expert operator, in one of the first hospitals in the city. No one could take the slightest exception to the operation, but the surgeon left this patient in the hands of an inexperienced nurse, who had never seen such a case before, and the patient died. Another patient of mine had exactly the same experience, and so on through a long list of harrowing accidents of all kinds. The one man whom I have known in surgery who was willing to take a case and some advice with it was William T. Bull, whose cases of laryngectomy turned out better than those of anyone of his time. The suggestions in this paper meet with my approval, as I believe they are very valuable. There are two kinds of specialists as well as two kinds of surgeons. One kind is the therapeutist, whose strength lies in the medical side of laryngology, and the other kind is the natural born surgeon. It should not take long for one to discover on which side lies his forte.

Dr. J. Solis-Cohen, Philadelphia: One case occurred in my own practice which I have never published, and one very similar to that mentioned by Dr. Delavan. As all the people connected with it are now dead, I will relate it. I performed a laryngectomy, leaving the wings of the thyroid cartilage, taking out simply the interior, by a method which I devised at that time. I performed the operation and I had, as I thought, a good assistant at the hospital. I lived only three or four squares from the hospital, and at twelve o'clock that night it seemed to me I must go to the hospital and see what was the matter with that patient. I went and found the male nurse asleep on the floor beside the patient; the resident physician had told me he would stay up with the patient all night himself, and would let me know if I were needed. Then I went into that resident's room and found him in his bed asleep. And if I had not been at that moment by his side, that patient would have suffocated from trouble with his tube.

Another case occurred somewhat like that, and I felt a desire to go to the hospital, and when I reached the bedside I found the man struggling with a trained nurse, who was trying to put in the tube upsidedown, strangling the man before my very eyes. Ever since then I have stayed by my patient for twenty-four hours. There are more patients lost by the after-treatment in laryngectomies than by the improper performance of the operation.

Dr. Henry L. Swain, New Haven: When we consider that

Gluck, who was the pioneer in doing complete laryngectomy, has performed his last sixty-one operations without a single operative death, it proves that the general surgeon, when he learns how, can do the work pretty well. When you take a man who does a thyrotomy and scoops out the growth without rhyme or reason, we understand why it is desirable for the laryngologist to be present. In other words, we who are interested and know the anatomy of the parts are better qualified to advise the general surgeon, and should at least be on hand to lend assistance and advice when such operations are being performed on our patients. This is equally true in removal of the hypophysis. If the surgeon wants to do the external surgery, all right, but we could do the operation as well or better.

Dr. John F. Barnhill, Indianapolis (in closing): I agree with what has been said. I think, however, it was not understood that I feel, as do some others, that laryngologists and otologists should do neck and head surgery in general. How often it is that we remove a tonsil and we find that the child or adult has a large number of decaying lymphatics that must come out; it seems that we should be able to undertake this work and not have to call someone else to do it. I believe the patient would stand a better chance of good recovery, and we would have a better interest, and that by proper and sufficient training we should be prepared for this work even better than is the general surgeon of today.

Laryngocele Ventricularis.

By George E. Shambaugh, M. D.,

Chicago.

This name was applied by Virchow to a condition which he had found postmortem, consisting of an elongation of the ventricle of Morgagni, extending as far as the upper border of the thyroid cartilage and occasionally to the hyoid bone. This condition is now believed to be a normal anatomic variation. The term laryngocele ventricularis, as here used, applies to a cystic dilatation of the ventricle of Morgagni, a pathologic condition which results from forcible distention with air of the ventricle, usually as the result of coughing spells or the use of wind instruments. It is probable that as a predisposing factor an elongated appendix of the ventricle must be present. Cases occur where there is only an intralaryngeal distention, others with only an extralaryngeal distention, where the cyst has broken through the thyrohyoid membrane, producing a swelling in the neck, and other cases where there exists both an intra- and an extralaryngeal distention.

The case here reported occurred three years ago, in a woman, sixty-nine years of age, and developed in the course of a violent coughing spell. There was a distention in the neck the size of a hen's egg and an intralaryngeal swelling which filled at least two-thirds of the space in the larynx. About a year after the development of the laryngocele the condition became infected, and the most annoying symptom since then has been the discharge of quantities of foul smelling pus into the larynx; as much as a quarter of a tumblerful can be expelled at one time by pressure over the external swelling. The case has been greatly improved by an external operation, in which the cyst in the neck has been removed down to the opening of the thyrohyoid membrane. The intralaryngeal condition has been operated upon by slitting the cyst from below upwards with a hooked knife. There is still present an enlargement in the larynx which causes some annoyance, especially from the discharge.

DISCUSSION.

Dr. E. Fletcher Ingals, Chicago: I had a similar case without infection. I treated it by aspirating the cyst, and then injecting it with equal parts of 95 per cent carbolic acid and glycerin. At any rate, I got an excellent result at that time. But he came back to me within the past month, and the cyst is now altogether intralaryngeal, as large as a filbert, and I must do the same thing over again.

The Employment of Skiagraphy in the Diagnosis of Enlargement of the Thymus Gland.

By D. Bryson Delavan, M. D.,

New York.

Enlargement of the thymus gland, whether associated with the conditions known as "status lymphaticus," or otherwise, can no longer be called a pathologic curiosity.

Cases occur with sufficient frequency to have brought the subject prominently forward, and a considerable literature upon it has been developed during the past ten years. Indeed, there are few clinics in which accidents due to this cause have not occurred to patients under operation. Diagnosis by ordinary means is often difficult, and the only intimation of trouble comes late.

Another difficulty lies in the infrequency with which illustrative cases present themselves. The average clinical attendant may never have seen one until he finds himself confronted with the fatal occasion.

Two cases are recorded in which the Roentgen rays were used, aiding materially in the diagnosis of the presence or absence of an enlarged thymus gland.

Routine examination of every case requiring operation would be very expensive and consume much time, and the reader suggested the possibility of reducing the cost and lessening the time consumed.

Since to examine all would be impractical, suspected cases only should have X-ray examination before operation is attempted. Careful instruction should be given and clinical assistants warned as to the dangers of operating on patients with enlarged thymus gland, that they may be made competent to diagnose such cases when they present themselves.

DISCUSSION.

DR. CORNELIUS G. COAKLEY, New York City: I recently had an experience in an adult. A man was sent to me for an opinion as to what should be done for what seemed, from the history before seeing him, to be goiter. The man had an enormous neck. The entire obliteration of the angle of the jaw was present, so that from the neck to the jaw was a straight line. There was slight exophthalmos. The pulse rate was 130 when quiet, and feeling that in all probability it was a case of exophthalmic goiter, I referred him to Dr. John Rogers. Radiography showed a tumor behind the sternum, a good sized mass, with every suspicion that it was an enlarged thymus instead of a thyroid. After observing him for a week or ten days, Dr. Rogers thought the enlargement, which varied from time to time, was due to some lymphatic obstruction connected with the thymus gland, and suggested that he make an exploratory incision of the thymus behind the sternum, and if feasible to explore the enlarged growth to do so, and if a malignant process were found to leave it alone. He made his incision in the skin, and found that, instead of small peripheral veins, the superficial veins were as big as his little finger, perfectly enormous. He got his finger down and found an enlarged thymus gland, but thoroughly and extensively bound down to all the tissues in the thorax, with no possibility of removal without the death of the patient. He was sewn up and lived for only a few months. It is the only case of unquestioned malignant disease of the thymus in an adult that I have ever seen, and it was diagnosed pretty satisfactorily by radiograph.

DR. JOHN F. BARNHILL, Indianapolis: The radiograph looks very much like a number of radiographs I have seen of the thyroid in the substernal variety, and of course that would hardly be the case in a child so young, but it might have been the case with Dr. Coakley's patient. It must be very trying in such a case to be sure of the diagnosis. Dr. Wilson, of the Mayo clinic, has a large number of cases which closely resemble the one reported by Dr. Coakley.

DR. BURT R. SHURLY, Detroit: This question of enlarged thymus is exceedingly interesting. These cases afford us practical interest when we know that tonsils and adenoids are quite frequently associated with these attending conditions of hypertrophy of the thyroid and thymus, and it is particularly interesting from the standpoint of the interrelationship which the tonsils and adenoids and thyroid have to each other. The enormous percentage is what I want to call attention to in a large autopsy report, showing that we undoubtedly operate on thousands of cases of enlarged thymus without knowing it, and it is only the very unusual case that dies suddenly that comes under our immediate observation. I happened to see a postmortem at the Massachusetts General Hospital that showed what an alarming condition can be present in the way of an enlarged thymus, without anybody knowing anything about it. There are but few diagnostic methods from the physical signs to make one even suspect it. This case had all the clinical symptoms of status lymphaticus, and the boy had died from an incised wound of the knee under ether with just a few stitches being necessary. This brings vividly to mind in what great danger we are continually in operating on adenoids and tonsils without knowing our danger.

Dr. Thomas Hubbard, Toledo: Thymic asthma is a condition related to something like status lymphaticus, and pediatrists are working along a line similar to that suggested by Dr. Delavan for treatment by the X-ray; this is marvelously effective. Two cases have come under my notice, though neither was my case. One child was sent for an adenoid operation, the child under one year of age. The difficulty in breathing impressed the physician, and he called in a pediatrist, who suspected thymic asthma, and the X-ray showed a merging of the thymus and heart shadows, and following the line of treatment which is now undertaken with the X-ray, after seven treatments there was produced almost immediate and permanent atrophy of the gland.

May this shrinkage not go on to an undersirable degree?

Another case of similar type is one in which almost magical shrinkage of the thymus was produced in about the same aged patient. Both children seemed to have but a short time to live, both were extreme cases. The interesting feature is that the X-ray is not only a diagnostic factor, but also a positive therapeutic cure in the very young cases which we occasionally see, owing to the obstructive type of respiration which is sometimes mistaken for adenoid obstruction.

Dr. Henry L. Swain, New Haven: I have twice had cases of thymic asthma, and diagnosed the condition with X-ray pictures, showing we were right, and then have secured marked benefit and a cure by the simple use of adrenalin ointment. The two glands, the suprarenal and the thymus, are antagonistic in action, and it did work very well, rubbing adrenalin ointment in over the top of the gland three or four times a day, and we got an appreciable diminution in size and the restoration of perfect breathing.

Dr. B. Alexander Randall, Philadelphia: I would like to call attention to a case in which, after excision of the tonsil, I lost the patient, twenty-two years of age. It seems to me that much of the foregoing discussion points to the occurrence in rather early life, and we need perhaps to emphasize this possibility of a later exposition of it. This young man had two or three tonsil operations under ether, and had come through them successfully. Every care was given to him. There was no suggestion to my mind of thymic asthma, and his family physician had not found any evidence, and the amount of thymus enlargement found after death was not enough to give any mechanical explanation to the fatal issue, and yet he died twenty hours after the operation.

Nasopharyngeal Myxosarcoma—Several Operations and Finally Spontaneous Recovery, Under Observation for Twenty-seven Years.

By E. Fletcher Ingals, M. D.,

Chicago.

A boy of thirteen years was first seen by the writer in 1883. He had a large tumor filling the nasopharynx and right nares, obstructing both sides by its pressure. It proved to be a myxosarcoma; most of it was removed. A small part grew back of the pterygoid process and appeared under the zygomatic arch in right cheek. Operation was attempted through the angle of the mouth, but severe hemorrhage compelled the closure of the wound without effecting this purpose.

After all the tumor had been removed anteriorly there still remained a large mass in the posterior nares attached to the roof. There was no way in which a wire could be placed around this. The writer forcibly introduced brass tubing containing a sharpened piece of copper wire. Several brass tubes were thus introduced and through these wires were introduced encircling the growth in the different loops. The tumor thus was completely severed and withdrawn through the mouth. The patient became unruly and was sent home.

The tumor continued to grow, causing great deformity of the right cheek, and destroyed the vision in the right eye. Three or four years later it began to atrophy, and when he appeared fourteen years afterward, and again after his first visit, there were no remnants of the tumor, although the deformity of the cheek, the enormous cavity of the nose and the absence of vision from the right eye continued. Although this growth was of a semimalignant character, it followed the well known tendency exhibited by fibrous growths in this locality, of retrogression and final disappearance between the nineteenth and twenty-third year of the patient's age.

DISCUSSION.

Dr. Harmon Smith, New York City: I wish to relate briefly a case reported recently of lymphosarcoma. I do not know whether the difference in pathology would alter the result with myxosarcoma. This case was sent to me by the General Memorial Hospital, to relieve the man so that he could breathe and swallow. The growth involved the right tonsil, pharyngeal wall, and palate, so that he could not breathe except in gasps, was cyanotic and greatly emaciated. I operated, doing a preliminary tracheotomy, believing I would have hemorrhage; I took away half the tonsil and lateral pharyngeal wall, but had no hemorrhage; then I packed, but still no hemorrhage. On the second day I removed the tracheotomy tube. This was done a year ago, and the patient returned again last January to the clinic, when there seemed to be involvement on the left side, and it was found by examination to be lymphosarcoma. He disappeared again for a month or so, then came back with extensive involvement of the left side. I took out the left tonsil, left pharyngeal wall, and the remainder of the palate. He seems now to have completely recovered. The only complicating feature of the case is that he had been subject to epileptic attacks, and when these tumors began to grow the fits increased in number; following operation they subsided for a month or so.

The Simulation of Paranasal Sinus Suppurations for Teaching Purposes.

By Greenfield Sluder, M. D.,

St. Louis.

The accessory sinuses of the nose having been opened by dissection from its cranial aspect in a section of the skull previously decalcified or hardened in formaldehyd and stained in an ammoniacal solution of carmin, is then preserved in a 2 per cent solution of benzoate of soda. The latter prevents decomposition and also hinders corrosive effect on the hands. To simulate pus a preparation of subcarbonate or hydroxid of bismuth held in suspension in an hexatomic alcohol (mannite) and stained with anilin yellow and methyline blue is required.

A drop of this preparation is introduced into the opened sinus, and the examination is now made with a speculum introduced into the nose by means of a reflected light.

The simulation of the clinical picture thus produced is so true to life as to be astounding, and all the subtle variations may be reproduced by the quantity of the mixture or its dilution.

The Correlated Action of the Pharynx and Soft Palate, and Its Effects Upon Postnasal Diagnosis.

By Greenfield Sluder, M. D.,

St. Louis.

The resultant action or effect of the pharynx and soft palate acting at once in the functions of empty swallowing and gagging is here considered.

There is a gentle degree of muscular contraction in the ordinary act of swallowing, while in gagging the vermicular action is from below upward with the strongest contraction.

The anatomic conditions with careful measurements are described and the dimensions given.

A pigment of a mixture of bismuth subcarbonate and hydroxid is introduced through one nostril by means of a small cannula and syringe to arrive at the upper surface of the soft palate at a point in the center line of the choanal outlet.

In a normal adult pharynx, upon swallowing it is found to be spread over its posterior wall as high as the lower margin of the eustachian tube on both sides.

This, however, is by no means constant, and there is a varying degree of obliteration that may take place in swallowing or gagging.

The degree of elasticity in the soft parts is practically constant, and hence it is possible that obliteration may occur by the easy play of the muscles..

The greatest value of these studies is to know that by the ability of the small pharynx to approximate its walls it possesses the power to wipe away small amounts of thin secretion from any point of the choanal plane.

The practical application of these observations is that it illustrates the difficulty of locating discharge from the accessory sinuses into the posterior nares if the patient gags much.

Alterations in the form and size of the pharynx make the various deceptions possible. It is of course self-evident that pus at the classical sites well forward of the choanal plane, with or without a clean pharynx, is of conclusive diagnostic value, and is uninfluenced by any of the above enumerated possibilities.

It is distinctly helpful to know to what extent a given nasopharynx is obliterated in swallowing or gagging.

DISCUSSION.

Dr. Cornelius G. Coakley, New York City: We have had now an actual demonstration and exhibition of the appearance of sinusitis in the field of the nasal pharynx which have not arisen there but have come from the nasal accessory sinuses. I think this is one of the most valuable contributions to the aid in diagnosis of sinus disease we have had in a long while.

Dr. B. Alexander Randall, Philadelphia: In speaking some years ago about the rather overlooked action of the upper edge of the superior constrictor which forms the socalled cushion, I dwelt a little bit upon some of these points, and I think we have to thank Dr. Sluder for having made the possibilities in that matter more interesting and clear. And I think we should bear in mind in this matter the extreme shelf-like character of that upper edge of the muscle, and take note how the soft palate will go entirely above that and show a deep cavity underlying the palate and modify this shelf-life effect, and this will go to show why from below in many cases the palate can reach clear to the vault.

Dr. John F. Barnhill, Indianapolis: This has been a very practical sort of paper. For a long time I have doubted any such thing as Thornwaldt's disease, namely, that pus formed in this normal pocket because of adhesions closing its mouth. I have yet ever to see such a thing, and I have for a long time regarded pus in this region as absolute evidence of either postethmoidal or sphenoidal disease.

Limitations of Bronchoscopy.

By Chevalier Jackson, M. D.,

Pittsburgh.

After a long series of successful bronchoscopic foreign body removals one is apt to think there are no limitations to bronchoscopy. The author had had five failures, one of which he excluded because he alone had bronchoscoped the case and permission for a second bronchoscopy had been refused. The other four cases had been attempted by two or more other bronchoscopists, and therefore might be said to define the limits of bronchoscopy. The limitations of bronchoscopy were reached in the inability to find a small foreign body far down and far out at the periphery of the lung, rather than in a failure to remove when found. The limitations in a particular case could not be said to have been reached until bronchoscopy had failed at the hands of at least two bronchoscopists of experience. Then thoracotomy should be done immediately, without waiting for pus formation. In his own cases the author would not feel justified in advising thoracotomy until another bronchoscopist besides himself had failed. Waiting for a foreign body to be coughed up was inadvisable, because, as shown by Delavan, even after expulsion, death had followed from disease meanwhile set up.

DISCUSSION.

Dr. Cornelius G. Coakley, New York City: With regard to the case of 1908, referred to, this woman had held a pin in her mouth; it was one with a white bead head and was about an inch long. She also had a very large goiter which had compressed and dislocated the trachea so that it was practically impossible to pass a bronchoscope down to the trachea. We could not use force enough to pass it below the compressed area of the trachea as far down as the bifurcation. A trachectomy was done and then a subsequent attempt was made to get the pin; the patient coughed and I lost the pin, which went down further with the point up, and although I was able to see it I was later unable to get it. Dr. Jackson did not even see the pin. I think there is no question that had the modern methods of lung surgery with the intratracheal anesthesia been then developed, it would have been a perfectly safe and probably successful procedure in removing this pin. This attempt took place in about the first three weeks of the involvement. Dr. Jackson, in his modesty, did not tell you of another case. Dr. Jackson very kindly came to Rochester about two years ago to see my sister-in-law, who had inhaled a piece of orange peel through the larynx into the trachea, and developed soon after a very severe irritating cough and bronchitis, forgetting all about the original cause until about two weeks after the accident, when the physician discovered this localized bronchitis and could not understand why it was localized until he got this history. Moreover, the fact that on two or three previous occasions some similar foreign body had been taken in during the process of mastication, coughing and inhaling, and each foreign body had been expulsed within a few hours or two or three days after the accident. A radiograph showed considerable involvement of that side of the lung, but air could get in. After a physical examination Dr. Jackson decided, although there was nothing showing in the radiograph, not to do a bronchoscopy. The patient developed an abscess there and a bronchiectatic abscess or abscess of the lung, and discharged pus in great quantities and lost fifty or more pounds in weight during the next six months. The sputum showed no evidence of tuberculosis. She made a good recovery after a year of suppurating process in the bronchus or lung about this bit of white skin from inside the peel of the orange. If Dr. Jackson had gone down and done a bronchoscopy, in all probability with his skill he would have found that piece of skin and removed it and saved the patient the following dangerous, but fortunately not fatal, condition.

Dr. Thomas Hubbard, Toledo: With regard to the limitation of bronchoscopy, this may often be established by the patient. Nothing is so exasperating as not to have your patient's support and that of his physician. Dr. Jackson will corroborate me in saying that secondary operations are very difficult ones without the full support of the patient and attending physician. On the other hand, occasionally the support of the patient is a factor in success. I recall a case of a woman who had a fragment of dental cement in the lower right bronchus, and one of these radiograms reminds me of it; it was located about the ninth rib posteriorly, with some months of ulceration, abscess formation, and all symptoms of tuberculosis. This woman's intuitive conviction that she had a foreign body there saved her life. Although two or three radiographs showed nothing, she insisted there was something there, and finally a competent roentgenologist located it. The first attempt at removal was a failure; the abscess cavity was full of pus and débris, and I could not locate the foreign body; the second attempt was made with a stereoscopic picture to guide us, and we successfully removed the foreign body and the patient recovered. Following the first operation I told her we had failed, but she said, "Never mind, you will get it the next time." That courage inspired us to do our best, and we were successful.

I recently had another patient with an upholsterer's tack in the right lung, who had been worked upon four hours consecutively by a bronchoscopist under local anesthesia. He had literally soaked the patient with cocain and his courage never faltered. After four hours' trial he consented to another type of operation. This I deemed impracticable by the upper method, fearing laryngeal edema after such a prolonged use of the tube. So a low bronchoscopy was done and the foreign body was found. The previous efforts had turned it sideways and made it very difficult to extract. I must say that I doubt if the upper method could have reached the point of that nail, because it was so far to the right, and it was necessary in the introduction of the tube through the lower wound to carry it off at an extreme angle to bring the tack into the tube.

Dr. Emil Mayer, New York City: I recall being asked to see a boy who had a tack in his right bronchus, which had been there for more than a year, in the Presbyterian Hospital in New York. It was quite easy to do the bronchoscopy, but I simply could not see any sign of this tack. The bleeding was profuse and put me in such position that I could not see any evidence of the foreign body, and I felt that here was one of the important rules to live by—"be sure you are right, then go ahead." It is possible if then I had known as much about using the powerful magnet as Dr. Iglauer has recently recorded, I might have been more successful.

In another instance, showing the difficulties of bronchoscopy, I was called recently to see a young infant of about thirteen months, who had inhaled an open safety pin. A picture showed the pin in the upper portion of the larynx, and the local physician thought he could get it out by doing a tracheotomy. He failed. A second picture showed the pin had slipped down into the bronchus. It was not a difficult thing to introduce the bronchoscopic tube through the opening the physician had made, but the baby's condition was poor and I could not find the pin; the child's condition becoming worse, I desisted, and a few hours later the child died.

DR. D. BRYSON DELAVAN, New York City: It is interesting to understand the limitations of bronchoscopy, but also to thoroughly realize what it has done for humanity, and we all recognize that it is purely an American invention. Dr. Horace Green was the first to promulgate this method of treatment. Before the days of bronchoscopy the inhalation of foreign bodies was necessarily fatal. I remember a case in the '80's at the New York Hospital, where a young trained nurse with pleurisy was placed in my hands and we aspirated the chest. When introducing the cannula, and just as we had it well in position and were about to withdraw the blade, the girl made a wild movement of the arm, drawing it sharply back so as to break the needle close to the body, and by the time we raised her arm the needle had disappeared. We said nothing about it; there was a rise of temperature, but the patient got well. I followed her about twenty years, during which time she carried on her function as a nurse in excellent health.

Another case was a young farmer, who inhaled a full head of barley. The accident was followed by violent pneumonia and that by abscess of the lung, which broke through the outer wall of the chest, and in coming away the head of barley was found intact. He survived all of this. Such results are extremely rare.

Dr. E. Fletcher Ingals, Chicago: I am very glad that Dr. Jackson has brought up this subject, and I hope he will in closing say something about the limitations as to time. Dr. Hubbard spoke of some one working for four hours, and this impresses upon me the necessity of having a final word on the time one may work on such a case. For my own part, I have felt that we ought not to work more than half an hour. When one feels the next second will be successful, he hates to quit; also when there is a good deal of secretion, you dislike to stop before you try once more. In some of these long drawn out operations, about nine-tenths of the time is occupied in swabbing and one-tenth in looked for the foreign body. If we say no case should be operated on for longer than one hour, we would not be far wrong; while half an hour is the limit in the majority of cases.

I have had my failures in getting out foreign bodies, and I have sweat blood over them. I have recently, as you know, written a short article on fluoroscopic bronchoscopy, which I think is going to be a great aid in certain cases. With foreign bodies which do not throw a shadow, we must still rely on ordinary bronchoscopy. When there is an abscess formation with much pus, it is often impossible to find the foreign body. When there is a stricture it is liable to be impossible. Fortunately, some of these organic substances will be coughed out, but I think that 90 to 95 per cent of people will die from foreign bodies in three or four years from various abscesses, usually multiple, unless the foreign body is removed.

Dr. William E. Casselberry, Chicago: These bodies do not always stay put in the lungs; they are movable, some of them, and it may explain why some of them, such as collar buttons, etc., have not been found on bronchoscopic examination. This was illustrated in my practice by a large grain of raw corn, first in the bronchus of a very small child; the child was small, and I should perhaps have made a lower bronchoscopy, but I made an upper bronchoscopy, and although there was considerable difficulty in getting this tube through and in getting vision, it did go to where the skiagraph showed a spot which seemed to be the grain of corn, and this showed in four skiagraphs. It corresponded to a place where there was obstruction and density of air. I aimed for that spot with my very small bronchoscopic tube, and searched diligently, but found no grain of corn. Things were beginning to look very uncertain when on withdrawal of the tube, gradually and cautiously, just as my tube slipped out of the top of the larynx, the grain of corn popped into view beneath one vocal cord. In that position of the patient, with the head down, it had left its position in the bronchus and slipped up.

DR. HARRIS P. MOSHER, Boston: I have put the limitations upon myself rather than upon the subject. Certainly, in the case where I hunted two hours the other day to find a foreign body, I felt the limitations were mine.

In one case, after the patient came out of ether, there was a right hemiplegia, but that was the first time it had ever occurred in any case I have had to do with. The question came up as to what was the cause, whether it was the heart condition, the strain of the cyanosis in a thick necked individual, or an embolus.

There is another thing in connection with bronchoscopy. I have not seen it mentioned in the books, but it has occurred to me three times successively. This is a procedure that I do not feel like bringing before you, as it seems like going back to working in the dark. That is the old procedure of fishing. As you know, in many cases when you get the open speculum in, which was used before Dr. Jackson's speculum was devised, the cords stand very clearly apart and you look well down into the trachea. The trachea, however, is not likely to open. It occurred to me in such cases you might use the trachea for the tube in place of the bronchoscopic tube, in other words, having the cords well open, you could go down with your forceps and take a blind shot in the dark, knowing it was a blind shot. The first case of mine was in a two-year-old girl, who had a two-inch pin lying head up and across. In that case a blind shot, boxing the compass with my forceps, was successful. The second case was a fifteen-months-old baby, who had a nail in the lower bronchus, head up, and in that case I decided to try a shot before putting the case under ether. I caught the head of the nail and brought it out. I just have had a third case in connection with Dr. Clark, in which a fifteen-months-old baby had a peanut in the bronchus for three or four days; the trial of a luck shot here did not reveal anything. A luck shot in the right bronchus produced nothing, but in the left bronchus it brought out the peanut. If you will gauge the limitations and put a limit on yourself, it is worth while to try this shot in the dark, because it will sometimes work.

Dr. Chevalier Jackson, Pittsburgh (in closing): In regard to Dr. Mosher's statement as to the limits, the point I want to make is that the difference between personal limitations and the limitations of the method are shown when two men have tried and failed, for then I think we can call that failure due to the limitations of the method rather than to personal limitations.

In regard to the case of embolus that occurred after a foreign body which was quite easily removed four weeks previously with no special difficulty. Either from a septic endocarditis or from the lung itself an embolus had gotten into the cerebral circulation. His physician reported the boy improved for almost a month and gaining rapidly, when suddenly he had a convulsion with paralytic symptoms.

Dr. Swain raises a number of interesting questions in regard to anesthesia, but I have seen no reason to change my attitude in this regard from that of two years ago, especially in children under six years of age.

In regard to suspension laryngoscopy for foreign bodies, I have not tried it, and therefore am not qualified to speak; I have no doubt it has a large field of usefulness.

The limitations in regard to time were asked for by Dr. Ingals. Each must decide for himself. The limitations stated by Dr. Ingals are about right. If every man would publish the time used on every case it would be well. Half an hour for a child and an hour for an adult might be taken for a standard, to be modified in the particular case. My own personal limits have been in adults three and a half hours, but this patient had no anesthetic, he was a marathon racer, an athlete used to enduring physical stress, and he insisted on my going ahead.

Dr. Ingals brought up the limitations in upper lobe bronchoscopy, which I am glad he called attention to. The limitations I spoke of were far out in the periphery in the posterior branch, too small for bronchoscopy. All were failures to find, not to remove foreign bodies after finding them.

Dr. Delavan referred to Horace Green's work; this is entirely new to me.

Dr. Mayer's and Dr. Hubbard's points bring up too much for this discussion. In regard to Dr. Coakley's case, where we decided not to do the bronchoscopy, that was an error of judgment on my part, and is not to be taken into consideration in this discussion, because if we include the errors of judgment there is no limitation to what bronchoscopists may do.

SYMPOSIUM.

EMPYEMA OF THE NASAL ACCESSORY SINUSES IN CHILDREN UNDER FOURTEEN YEARS OF AGE.

The General Considerations of Empyema of the Nasal Accessory Sinuses in Children Under Fourteen Years of Age.

By Lewis A. Coffin, M. D.,

New York.

It is indeed remarkable that although case after case of affection of the accessory sinuses in children has been recorded by rhinologists, no mention whatever is made thereof in the textbooks devoted to pediatrics. As a consequence, many cases that have advanced to the suppurative stage might have been prevented and saved much suffering had an early diagnosis been made and proper treatment instituted. In acute conditions, if a sinusitis is suspected, there is a copious discharge which may be washed out or otherwise cleared of secretion; if then negative pressure is applied to the nostrils and more pus or mucus found, we may be quite sure that it comes from some of the accessory sinuses.

Children subjected to the test showed streptococci, staphylococci and pneumococci.

The safest form of treatment is in the use of the postnasal douche.

The writer has found great satisfaction in treatment by negative pressure (suction) and the use of autogenous vaccines.

The Pathology of Acute Sinusitis of Children Under Fourteen Years of Age.

By George B. Wood, M. D.,

Philadelphia.

The pathology of acute sinusitis is influenced by the severity of the infection and by the resistance of the patient, and upon these two factors depend the degree of inflammation. The characteristic changes found in the mucosa in the mild cases are: congestion and slight edema of the connective tissue, increase in the number of beaker cells in the epithelium, and slight increase in the number of lymph cells in the superficial layers of the connective tissue. In the more severe cases the edema is increased, the congestion more severe and the extravasation of the red blood cells into the connective tissue stroma becomes so intense that the condition resembles a subepithelial hemorrhage. The leucocytic infiltration is marked but still only involves the subepithelial layers of the connective tissue. In only the very severe cases does the whole connective tissue layer become infiltrated so that the periosteum is attacked. Infiltration of the periosteum is very apt to be followed by bone changes. In diphtheria sinus involvement is very frequent, though the majority belong to the mild catarrhal group. In scarlet fever sinusitis is less frequent but more severe, so that bone involvement is quite common. Other infectious diseases show nothing peculiar or characteristic.

The Surgical Treatment of Empyema of the Nasal Accessory Sinuses in Children Under Fourteen Years of Age.

By C. G. Coakley, M. D.,

New York.

The writer is convinced that inflammation of the nasal accessory sinuses occurs as frequently in children as it does in adults.

As the sinuses are undeveloped, there is a greater tendency to spontaneous cure.

General anesthesia is necessary for examination, if under five years of age; transillumination is valueless under ten years of age.

In mild cases suction may be used to advantage.

Cases requiring surgical treatment have either a swelling over the antrum or around the orbit.

The antral cases are most always associated with an osteomyelitis of the superior maxilla and are operated through the canine fossa with a counter opening in the nose.

The orbital cases, if mild, are kept in bed with cold compresses and frequent instillation of a 1 per cent solution of cocain and a 1/20,000 solution of adrenalin. The severer type requires operation without waiting for the development of a radiograph, and is an ethmoid and sphenoid exenteration through the external route.

A probe is passed into the frontal sinus and the diseased membrane must be removed lest there be recurrence; the wound should be left open. There is no consequent deformity.

DISCUSSION.

Dr. Harris P. Mosher, Boston: It is hard to get data on the development and the size of the accessory sinuses in children. Very few bodies of children find their way into the dissecting room, and children make poor subjects for X-rays. Occasionally, however, we do get an X-ray, or have a chance to investigate the sinuses at autopsy. In such instances I have usually been surprised at finding the sinuses larger than I anticipated. This is especially true of the sphenoidal sinus. In one case, a boy of twelve years, the sphenoid was of average adult dimensions. Most of us, therefore, have to go for our information to the men who have been fortunate enough to have material for making observations upon the sinuses in children. Onodi, who has published a book on the "Accessory Sinuses in Children," is our chief authority. I have roughly traced some of his plates and grouped and charted his findings. They help to visualize his results. Also, I examined ten X-rays taken of children's heads, in cases where there was a question of fracture of the skull. These rough tracings are also submitted.

According to Onodi, less is accurately known about the maxillary sinus than about the others. Investigation seems to have been focused upon the frontal sinus and the ethmoid cells. The antrum appears in the fourth month of fetal life, and at birth is a cul-de-sac about the size and shape of half of a coffee bean. Tooth buds take possession of the body of the superior maxilla and give the antrum but little room until the second dentition. At this time the antrum enlarges quickly. Another important observation in connection with the antrum in young children is that it is best approached from the nose through the middle meatus. There is but little space under the inferior turbinate, and the wall of the antrum there is much thicker than in adult life.

The ethmoid cells are present at birth, two or three posterior cells, and a like number of anterior cells. The posterior are the larger; a distinction which they retain throughout life. The ethmoid cells increase rapidly in size, relatively much faster than the frontal sinus or the sphenoid. At the thirteenth year the ethmoidal labyrinth is of adult width, and the cells nearly, if not actually, of adult size. An X-ray taken at this period is striking, because the ethmoid labyrinth is wide and apparently fully developed, whereas the frontal sinuses (in comparison) are small.

There is no frontal sinus at birth; only a comma-like fossa at the summit of the unciform groove, which by upward growth is to make the sinus. By the third year the frontal sinus is peeping above the level of the cribriform plate; the sixth year the height and width may measure 10 and 10 mm. The frontals grow very unequally. Onodi figures one case of an eight-and-a-half-year-old child in which an adult sinus was present. From ten to fourteen years it is common to find what might be classed as a small adult sinus. I have tracings of a sinus at ten years, and of one at fourteen years, which illustrate this.

The last accessory sinus is the sphenoid. At birth this sphenoidal sinus has a well formed ostium and a small cavity. By comparison the frontal sinus at this time is far behind the sphenoidal in development.

The order in which the sinuses enlarge seems to be roughly as follows: From birth to the third year the ethmoidal cells have the lead; then the sphenoid starts to enlarge actively; at the sixth year, or the period of second dentition, the antrum becomes active, takes the lead, and ever afterward holds it. From the sixth year also the frontal sinus, the laggard of the sinuses, increases rapidly.

The gist of the matter is, that from the third year there is an antrum large enough to permit of surgical treatment. The same is true of the ethmoid labyrinth from six years onward, and of the frontal from the eighth year. From the third year a surgical sphenoid may be expected. Precocious development of the sinuses, and there are numerous cases reported of surgical interference which show this, may make any or all of the sinuses of surgical size before the periods just mentioned.

DR. THOMAS HUBBARD, Toledo: I would like to speak of three or four types of cases which have come under my observation, of acute sinusitis in children. First, a young child of six years of age with orbital abscess following measles; this case was seen some time after the initial attack, and there was a sinus which had ruptured through the orbit, and although the child was in good general condition, the parents refused operative interference, yet nevertheless the child recovered. The second is one of the fulminating types of scarlet fever in a girl exposed to the cold after the initial symptoms of fever, and she very suddenly developed acute general sinusitis, and inside of forty-eight hours there was coma, and death inside of three days. That was one of the cases which are absolutely inoperable. The third type is of scarlet fever of less malignant character, but the initial symptoms were otitis media; very prompt paracentesis; the next day symptoms of marked pharyngitis, and following that the rash and typical symptoms of scarlet fever. Although this child was in the best of hygienic surroundings, with the best of nursing, the ear went on to a suppurative mastoiditis, and a mastoid operation was necessitated about the third week. General sinusitis on both sides was developing with gradually increasing severity; the symptoms were typical and worse on the side of the involved ear. This boy was at that time seven years of age, and the right sinus seemed to reach the maximum of inflammatory disturbance, then gradually subsided. This gave me hopes that the left side would follow suit, but the general systemic disturbance necessitated a general operation upon the left sinus about three weeks after the mastoid operation. A complete radical operation was done, modified. The frontal sinus was involved only in its lower portion, and consequently there was no opening above the orbital ridge. Complete ethmoid exenteration. Probably the sphenoidal sinus was also opened, as was the maxillary antrum, which was thoroughly cleaned out. Three or four days of marked improvement followed, then a relapse with a gradual rise of temperature. Autogenous vaccine made from the granulations taken from the ethmoidal cells was given, with exacerbation of temperature for about forty-eight hours, then marked improvement and complete recovery. The patient was under observation for five years with several severe attacks of rhinitis, but only last winter did he again develop any symptom of pus in any of the sinuses, and here it was necessary to wash out the antrum for a few days, and it then subsided.

Another case is of the subacute chronic type, in a child of six years, brought up on the floor of a basement; he had a succession of acute attacks of coryza, finally resulting in a general suppurative sinusitis involving all the cells on both sides. This boy was treated according to the method suggested by Dr. Coffin. It was impossible to irrigate the antrum more than about six times, for after that it produced such a nervous shock that it had to be discontinued. Negative pressure was undertaken every day, about three pounds, to withdraw the pus which was considerable, and after each treatment he would be very comfortable for some hours. There was more or less purulent bronchitis in this boy. We were finally driven to operate, but his condition was so critical that I limited it to an opening from the maxillary antra into the nose. Within twelve hours after operation his temperature was 103.5 degrees, and he developed a bronchopneumonia, and I am thoroughly convinced that a prolonged operation would have resulted in death. The antra have since remained comparatively clear, there now being natural drainage, yet eventually, as soon as his condition warrants it, it will be necessary to perform a complete exenteration of the ethmoids.

Dr. Emil Mayer, New York City: There seems to be another class of cases of this affection in children between the two types as mentioned by Dr. Coakley, of moderate inflammation and infiltration of the orbit, and of the severest type, and I have recorded such an instance and found to my surprise that all the other cases of a similar kind recovering had the same train of symptoms. All the patients were in the neighborhood of from three to five years of age, and all had the following conditions: an opening or perforation directly under the eye about half an inch, an ectropion, and foul smelling discharge. A probe dropped into the opening over the zygoma went into a cavity and turned toward the nose and was easily pushed into the nose. In my own case an external operation, consisting of linear excision, curetting and drainage through the nose, was followed by complete cure.

Dr. William E. Casselberry; Chicago: I wish to speak of a chronic type of case, particularly of a conservative operation that I have before spoken of, which, although these cases are in children, they are in the older children, and which I have found feasible in them. They affect children anywhere from nine to fourteen years of age. It is the kind of case you see frequently even in older people—nasal polypi in the middle meatus, polypoid enlargement of the middle turbinate, and pus in the antrum and anterior ethmoidal cells, and sometimes in the posterior ethmoidal cells. These polypi, if removed one week, will be there again the next week, developing with extreme rapidity. If removed, however, together with the better part of the middle turbinate, and at the same time you go a little higher and take the floor of the anterior ethmoidal cells, they do not return within the month, as before. This operation I have found feasible in a limited number of cases under cocain anesthesia. Occasionally I have had to give a general anesthetic. I recall one which resulted in such an amount of recovery that it has required no further operative procedures. The subject was impressed upon me by a child upon whom I did not succeed in making such an operation, and in whom I should have urged either an external or an internal operation under a general anesthetic. She was a beautiful girl, a blonde, in whom to propose any external procedure to the parents would have seemed like a sacrilege. I removed, in the fighting child, polyps from time to time as best I could without middle turbinectomy. I cleansed the nose and washed the antrum. The thing went along for three or four years, when, as she was traveling on the Rhine, she became suddenly seized with a severe headache, was taken off the boat to a hotel, and put under the care of an English surgeon, who said she had meningitis, and she died within a few days. There is always this menace, even in children, and I believe it our duty to establish drainage. I do not believe it our duty to establish that drainage instead of doing an external operation, if such seems necessary, yet in many cases internal drainage will be quite sufficient.

Dr. Robert C. Myles, New York City: The fundamental principle of these chronic cases, in my opinion, is the securing of proper drainage, and resolves itself into a surgical mechanical proposition. I think we have been a little conservative in not teaching more frequently these intranasal operations on the ethmoid and antrum of Highmore, in children under puberty. It is astonishing how a child can be trained to allow you to do it under cocain. I have started by opening the ethmoid cells, and before finishing have succeeded as well as though the patient were a grown person. I have used cocain frequently by hypodermic, and in this way it renders the operation quite painless if injection be made into the middle turbinal region. The exenteration of the bullæ ethmoidalis and the anterior ethmoidals has frequently been most successful. I believe we will be able a little later to open the antrum more successfully by enlarging the hiatus semilunaris and enlarging the upper lobe and securing drainage in that way, doing no permanent harm, but effecting permanent drainage, and thus paving the way for the future irrigation if necessary.

In a case of mucocele, if you make a permanent opening through the nose you will get the best results. In cases of chronic suppuration, those preceding atrophic rhinitis, it has been my custom to find the drainage fairly good. I have used in conjunction with other treatment a powder of aristol and boric acid, insufflating half a grain once a day into the nose, at night; and I do not know whether it is the iodin generated from the aristol or what it is, but it seems to me that the causal factor of suppurative rhinitis which terminates in atrophic rhinitis is sometimes completely arrested. In conjunction I use ichthyol as an ointment.

Dr. G. Ross Skillern, Philadelphia: It is astonishing how few cases have really come under observation and been diagnosed as such. I do not mean the acute cases, which we see in conjunction with the acute conditions, but the truly chronic cases. In the pediatric department of the hospital with which I am connected, there are a great many cases of children's diseases, and very frequently the laryngologic department is called upon to examine patients for sinus trouble, and in the last year I do not know of more than one or two well-marked cases of sinus trouble which we have been able to diagnose. This may be due to the fact that in the sinuses in children the mucosa and the underlying bone are so intimately associated and connected that we do not seem to have the same condition as shown in the textbooks pertaining to the adult, yet it seems that the cases are fulminating in type. In the operations we have done, mostly by the internal method, the bones are softened and broken down, showing a condition of infection of the entire wall of the nasal cavity of one or both sides.

In some of these bad eye cases it is absolutely necessary to go into the ethmoidals, but in the majority of patients we should try the intranasal method first, and the conservative methods, because at the best we are working under very disagreeable circumstances.

Dr. Hanau W. Loeb, St. Louis: The most unsatisfactory class of case of any type that can come under our observation is that of bilateral suppuration which without definite proof seems to come largely from the accessory sinuses in children. The nostril is exceedingly small, so that it is almost impossible to get a satisfactory view, the nose being really a duct, and for that reason not sufficiently developed to take care of the situation.

Dr. Virginius Dabney, Washington: I would first refer to a trinity of symptoms in the acute cases. First, there is the high temperature, frequently 104 degrees, quite unassociated with influenza or bronchial trouble. This, I think, is particularly remarkable when we remember the cause is an open empyema. Secondly, with regard to the prolonged convalescence. I have under observation a case which has been irrigated six times a day for ten days, with an immense amount of discharge. The case was not easily diagnosed; it was seen on the third day with an internist, but it was only by exclusion that we arrived at the diagnosis. Pressure on the canine fossa was painful, and also pressure over the supraorbital ridge. There was high temperature and all the train of symptoms which are recorded as typical, after three weeks of apparent cure. Under irrigation in these cases the temperature comes down to 99 degrees for ten days or so, then there is an exacerbation from a reaccumulation of pus. I would cite one case of a boy who went wading two weeks ago in a public fountain; no bronchitis; temperature suddenly shot up to 104 degrees. The pediatrist said he had colitis, etc. What he had was a pure infection of the antrum of Highmore, and this cleared up under irrigation.

Dr. John F. Barnhill, Indianapolis: I believe that we should do more than we have done heretofore in enlightening the general practitioner and surgeon as to the exact cause and number of cases that may arise from sinus disease. If we attempt to find out how frequently meningitis results from these sinuses, we are greatly handicapped.

I have had an opportunity of seeing a number of cases in which there was lack of fever, pain and distress, the thing we did find being the great exophthalmos with swelling of the lid and discharge of pus into the nose. Recently I had a child of thirteen years, in which there were no symptoms except this great exophthalmos and discharging fistula at the external angle of the eye. At operation I found the entire anterior and lower wall of the sinus necrosed, and it had to be taken away.

Dr. Coakley spoke of doing a secondary operation, leaving an external drain in the cases operated on by the semi-Killian method. It seems to me that we should do this at one operation, by making the drain large enough into the nose.

Dr. Greenfield Sluder, St. Louis: The sphenoidal sinus develops very early; specimens showed that by the completion of the second year of life the extension of the sphenoid, although scanty from anteroposterior measurements, was as far as the foramen rotundum laterally, and at the sixth year it had reached the vidian canal. Both the vidian and the second division of the fifth nerves come closely associated with the wall of the sphenoid, and I believe this fact offers the explanation for the recurring headaches in children which are sometimes seen as early as the tenth year; and I feel more convinced than I did last year, because during the interval I have seen the sphenoid put out an eye, and paralyze the third division, where the picture in a tractable child of ten years showed a polypoid swelling over the olfactory fossa, completely filling it, and bathed in pus from above. In the course of twenty-four hours that polyp disappeared under shrinkage, and the last vestige of pus with it. Under constant watching no further pus was found. In that particular case the second division of the fifth nerve and the vidian nerve took part in the pain. The treatment was satisfactory, the third division came back into almost complete function, although there is still a difference of two diopters prism. That case lost its malignant type as soon as the shrinkage took place. It was not operated upon.

Dr. Harris P. Mosher, Boston: Among the cases which have come to my attention, there have been two which I could not miss; in each there was a fistula under the eye which when investigated led to the antrum or nose.

Dr. Coakley's remarks regarding the slow pulse in acute ethmoiditis interested me. This suggests to me some cranial pressure, and I would like to know if that is his explanation.

Dr. Lewis A. Coffin, New York City (in closing): I selected the eye department of our hospital as the one in which to try out my method. I took an old aspirating apparatus with a vacuum in a big bottle, and cut off the tip of a rubber ink dropper and stuck the little end into the tube. By putting this into the patient's nose we found the dropper filling up at once.

With regard to the type of case cited by Dr. Mayer, there is such a type. I have a different feeling from him on the matter. I find that it is pathognomonic of an osteomyelitis and involvement of the alveoli, and the alveoli are diseased, and if probed it will bend toward the nose and will be easily pushed in. Very possibly the antrum is diseased also. The next case any one of you have I would suggest that you make a very careful examination of the alveoli.

In regard to the treatment of children intranasally, in taking out polyps, ethmoids, etc., we must differ very much in the class of children we treat. I could not do it in my patients under seven years of age; I do not own or know of sufficiently small instruments for this work.

In regard to the size of the sphenoid, there is a difference in Dr. Wood's and Dr. Mosher's statements. I have had some experience and believe that Dr. Mosher, who stated that the ostium was well developed with quite a cavity back of it at birth, is correct.

DR. GEORGE B. WOOD, Philadelphia(in closing): I would add just a word regarding the development of the sphenoid. In my own experience I have never seen a sphenoidal cavity under one year of age which I could recognize. I have cut sphenoids in children six months of age without the slightest sign of a cavity. Others state that it becomes of surgical importance from four to six years of age, and may be recognized occasionally as a dimple on the anterior edge of the sphenoid body during the first year.

DR. CORNELIUS G. COAKLEY, New York City (in closing): In the radiography of children there is certainly a frontal sinus well above the orbital ridge in children three years of age. One explanation may be that these children with discharge and diseased frontal sinuses may have abnormal development.

As regards the instruments for intranasal work referred to by Dr. Coffin, I would state that Pfau is now making instruments identical with those for the adult.

As to the size of the sphenoid, I had occasion to operate on a child with orbital cellulitis about a year and a half old, and there was a sphenoidal cavity the size of a hazelnut. The child died of laryngeal diphtheria three weeks later and we proved the size of this sphenoid at autopsy. Infection is more likely to come from the frontal sinus, but in the clinic cases I have seen it has come through an orbital cellulitis. The frontal sinus has not been involved particularly, and I think that an orbital cellulitis secondary to sinus disease is the thing which is very liable to extend into the brain.

With regard to the low pulse, I would say that in two cases I have examined the spinal fluid and there has been no infection, and in twenty-four hours after, through opening of the abscess, the pulse has come up and run very high, showing that the slowness of the previous rate was probably due to compression. The bone in all these cases has been of peculiar leathery consistency, requiring a forceps to get it out.

I can agree entirely with Dr. Coffin in his explanation of Dr. Mayer's case. Such are due either to necrosis of the superior maxilla or ethmoid, which has ruptured spontaneously, and such cases go to the eye man.

These cases, so far as I have been able to determine, have usually been streptococcic. The reason I leave the wound open is because I would do so with a streptococcic infection in the mastoid, and I believe in the type of cases I am speaking of, tense, shiny glaze of the orbit, if you close the wound you are in danger of keeping up the cellulitis and producing an extension into the cerebral cavity. You frequently get no more scar following drainage, although it may be wider and redder for the first four or five months, yet at the end of the year you cannot tell whether it has been closed primarily or healed by secondary closure. I got this idea of leaving the wound open in such cases from Killian.

The Relation of the Tonsil to Thyroid Disease.

By Burt R. Shurly, M. D.,

Detroit.

For some mysterious reason there exists in the state of Michigan an area in which there is an increased percentage of cases exhibiting disturbances of thyroid secretion. It is obvious that the physiology of the thyroid and other ductless glands is profoundly affected by toxic disturbances in general, and particularly those that enter by the lymphoid ring. The author has noted beneficial results after a tonsillectomy in patients who had incipient Graves' disease, thus adding another definite indication to surgical procedure.

When the routine examination of the nose, throat and ears includes the cervical and postcervical glands, thyroid and thymus, it may be possible to abort an incipient Graves' disease or pulmonary tuberculosis.

In moderate or severe thyroid insufficiency you may find a dry mouth and throat, with dyspnea on exertion. Voice husky or thick, defect or change in speech. Mucous membrane of upper air passages may be swollen or dry. Laryngeal muscles may show insufficiency. There may be perversion of taste.

Later in the disease hemorrhages from the nose, throat or lungs are common.

Treatment of the thyroid condition is indicated, but if improvement does not follow upon medical treatment, operative interference should not be postponed.

In all cases of thyroidism an examination of the nose, throat and ears is essential.

DISCUSSION.

DR. GREENFIELD SLUDER, St. Louis: I have started observations in the Children's Hospital in St. Louis, and a considerable number of children have been studied as well as adults, by me, in which there seem a clinical relationship between the lymphoid ring and the thyroid gland. The development of this district is by no means clear in the minds of anatomists. Just exactly what parts the various sections of the lymphoid ring develop is not settled. That the lingual tonsil develops from the same bronchial arch as the thyroid is a fact, and in early fetal life there exists the thyroglossal duct, which is closed before birth. It is sometimes found in the dissecting room. I have many times sought for this duct in the living, but have not found it.

Dr. Shurly reports a singular betterment by the removal of the faucial tonsils. My observations have been relative to the lingual tonsil, and in one case in which I did a perfect tonsillectomy some years ago 'I found a goiter this winter. The treatment in that child with a lingual tonsil resulted in marked shrinkage of the goiter, which was a simple hypertrophy. I have a considerable number of adults under observation, one young man of probably twenty-five, with an enormous adenoma in his neck that in the course of three months has shrunk some three-quarters of an inch in circumference. The gland is softened and the sense of comfort is greatly increased. That is the type of simple hypertrophy. Of hyperthyroidism I have had five cases. In four there was marked improvement by applications to the lingual tonsil. One was a case of long standing, operated on once or twice, in a woman by no means intact otherwise, who has so far not been improved. In another case of high grade striking exophthalmos and moderate adenoma, with a sense of impotency and general nervousness and tremor to such an extent that the patient was unable a short time since to feed herself, in that woman the first application to the thyroid gland was followed by a sense of betterment which she described as less tension. In the other cases under observation the thyroid has softened and shrunk, and in one very distinct and another less distinct has the exophthalmos receded. In one case in a child I saw the thyroid swell over night as the result of laryngeal tonsillitis; the tonsillitis got well, and in a few days the thyroid returned to normal size.

With regard to the application, it is silver in varying strengths up to a saturated solution, and salicylic acid in alcohol in saturated solution.

Dr. George B. Wood, Philadelphia: The relation of tonsillar infection to the production of hyperthyroidism was first called to my attention by Dr. Musser, with whom I saw a number of cases. One case in particular was that of a trained nurse who had recurring tonsillitis and exophthalmic goiter and hyperthyroidism following tonsillitis. The removal of her tonsils stopped the attacks for six months, and her goiter began to go down and the exophthalmos disappeared. At that time she had slight sore throat, followed by a less severe attack of hyperthyroidism, and after this attack I found on examination that at the operation I had not completely removed the faucial tonsils, there still being a piece in the upper part, removal of which has cured her and she has had no more attacks.

I have seen a few other cases. The thought in my mind was not of the relation of the lymphoid ring directly with the thyroid gland, but rather that we had an infective process originating in the ring which upset the metabolism of the body so as to produce goiter and hyperthyroidism, and that was also the view Dr. Musser held, and he believed that almost all goiters and all cases of exophthalmos with goiter were more or less associated with some form of cryptogenic infection, and that if such infections could be located and removed, the results would be good.

Dr. Henry L. Swain, New Haven: I have long associated the two things together of the connection between the hyperthyroidism and the tonsillar ring, but I had only put them as occurring in the same individual, and that any infectious process in a patient with Graves' disease would exaggerate the symptoms. I have known this to occur with antrum disease, with lingual tonsils, and inflammation of the lateral columns of the pharynx. This I say in spite of the fact that there are numberless cases which must have occurred to all of us in which the relation was established in this way—that in patients treated for lingual tonsil affections we find they cannot wear a tight collar when there is an acute exacerbation of the lingual tonsils. I had not thought that they were directly connected and that any phenomenon of internal secretion could exist between the two conditions.

Dr. George E. Shambaugh, Chicago: Dr. Shurly's paper brings out a point of great importance, the necessity of associating ourselves in our work with other fields of medicine, especially with the internist and his work. We too often isolate ourselves.

We have been interested in these problems of Dr. Shurly's in the Presbyterian Hospital for a number of years, and our view has been along the line suggested by Dr. Wood, that there is a focus of infection in the throat which causes it. The whole phenomenon of thyroid disease has been that developed from an infection; it may be a bad tooth, an alveolar abscess, but usually it is an infection gaining entrance through the faucial tonsils. The recognition of a chronically infected tonsil is very often overlooked. With the history of recurring attacks of sore throat, etc., anyone may recognize the possible relationship, but to find the chronic infection of the faucial tonsil is more important when there is no history of such disturbance. Sometimes the history is of an attack several years previously, and in such cases a pus pocket may be found which has given no symptoms. I have often been asked to remove the tonsils where the patient was suffering from systemic infection, since this was considered to be the source of entry; careful examination of the tonsils will probably show nothing externally to lead you to believe they are responsible, but after removal frequently an abscess will be found at their base.

DR. BURT R. SHURLY, Detroit (in closing): I would like again to call attention to the very great interest these cases should have for throat surgeons, and how frequently they are missed. Almost all the patients are of neurotic tendency, and such have an awful life to lead, and if we can find some few of them exhibiting these disturbances of the thyroid, it will be of great benefit to put these people on the right track.

Laryngitis Submucosa Subglottica Acuta.

By CHARLES W. RICHARDSON, M. D.,

WASHINGTON, D. C.

The writer gave a brief history of the condition, and why he preferred the name given to other designation of the condition. His attention was first called to this disturbance during the early days of his extensive intubation practice. The disease is most frequent in child life, though no age is exempt. The condition is apt to be implanted upon a severe laryngitis —a sequela of the infective diseases—or produced by foreign body or other sources of local irritation.

There may be more or less general inflammation of the larynx, but this is not always markedly present. The characteristic inflammation of the submucosa manifests itself in the subcordal portion of the larynx. The symptoms are manifested by slight hoarseness, often absent; by stridulous breathing, and by bellowing cough. There is not usual marked evidence of interference with aeration of the blood, as in diphtheritic stridor. The development of the embarrassment to respiration is more gradual than in laryngeal diphtheria. Inspection demonstrates two bright red bands located immediately below the vocal bands, nearly or quite meeting in the middle line. This condition was differentiated from laryngeal diphtheria by the author.

The treatment indicated is quiet in bed, depleting by the skin and bowels, local use of ice externally, and silver nitrate in one per cent solution, if possible, and ammonium bromid, carbonate and tincture of aconite internally.

Intubation becomes necessary if the respiration is seriously embarrassed. The paper then terminated with the report of four interesting cases which required intubation.

DISCUSSION.

Dr. Thomas H. Halsted, Syracuse: As I understand it, there is palsy of the vocal cords in the subglottic region and deposition of lymphoid tissue which becomes actively inflamed and hypertrophied at times, just as do the tonsils in the upper part of the throat, and I have always felt in these cases that we have an acute inflammation of that tissue. And therefore it has seemed to me that in the cases which I have seen most commonly they were in children with enlarged tonsils and adenoids, that is, the children would have recurring attacks. These cases are always, especially when severe, anxious ones, because there always comes up the question of possible diphtheria, and the general practitioner usually makes a diagnosis of diphtheria in the more serious cases, and it is a serious matter for us very often to oppose that diagnosis.

Dr. Burt R. Shurly, Detroit: Ordinarily I think practitioners differentiate between acute laryngitis and membranous laryngitis, and this particular condition is not one that is ordinarily differentiated. Those of us that have done intubation work realize the peculiar conditions found in the subglottic region of the larynx, and the loss of voice in these cases is apparently the thing which attracts our attention to this variety of laryngitis, and one which would put us on our guard as to the proper differentiation. Of course, these cases for the most part are those which are met in the homes of patients, and the difficulties of examining and actually observing the swollen ring is a thing which is quite apparent, and usually we have been called to these cases to do an intubation or for some operative interference for a case of membranous laryngitis. The danger of not differentiating is a very great one, because by far the high mortality would come on the side of the membranous form of inflammation. I have intubated a number of these cases that were decidedly urgent, and where this was the only thing to do to save the life of the child, and practically all these cases got well with intubation. The point of doing a sufficiently early intubation is well taken, from the fact that a child suffering from long continued dyspnea is in great danger of developing a pneumonia or some pulmonary condition. Of course, the differentiation from a foreign body is also a thing which should be prominently in mind.

Dr. Emil Mayer, New York City: There is one condition that has not been brought out, which is exemplified in a case under my care. A nurse in the Mt. Sinai Hospital had a good deal of dyspnea, and it was suspected she had diphtheria, although the cultures were negative. She was placed at once in isolation, where I saw her. Examination of the larynx showed the swelling Dr. Richardson has mentioned, and I felt it might show itself to be a case of subglottic infiltration. Nevertheless, I took the swab of the ordinary diphtheria culture outfit, bent it at right angles, and introduced it below the cords into the trachea, and got the cultures of Klebs-Loeffler bacilli there. There was nothing high up in the larynx, but it was in the trachea. She went through a most terrible time, but eventually recovered.

In regard to the treatment, I do not recall that Dr. Richardson brought out the great benefit from small doses of adrenalin applied directly to the parts, and when the acute inflammation has subsided, the advantage that iron applications produce in the healing of these conditions as the patient improves.

Dr. William E. Casselberry, Chicago: I am certain that this disease is deserving of a name of its own, and that it should be described as an entity. It is not always a false croup, or nondiphtheritic croup, or spasmodic laryngitis: the distinction which he makes is as to the progression of the dyspnea—the constancy is the best clinical distinction between the entity of subglottic laryngitis and the other forms just named. In subglottic laryngitis there is often that swelling beneath the cord, but when the condition is not at its worst the child breathes freely, especially in the day time, and the attacks are paroxysmal. In the membranous form you cannot be so certain, because the membrane covers the subglottic portion, but on the wane and in the beginning I have seen the subglottic inflammation.

The disease is by no means limited to children, even in those instances in which they may be taken for angioneurotic edema. I have seen several well pronounced cases with fair voice and continuous dyspnea in adults. I remember a woman who came to me with the history that she was subject to croup which would last about a week and she would feel that she must suffocate. She had been intubated on more than one occasion, as I recollect. The mirror showed a typical picture of subglottic laryngitis.

Dr. Henry L. Swain, New Haven: Thirty years ago, when I first yearned to look into a larynx, there were certain cases known as choroiditis hypertrophica inferior; they went through acute exacerbations. Since then I have seen these cases in adults where they have the history of attacks of choking. I always thought them acute exacerbations for which there seemed no very good remedy. In two cases I remember using almost full strength nitrate of silver, and in one the galvanocautery, but I reduced the chronic hypertrophy only very slowly.

Dr. Thomas Hubbard, Toledo: This condition is more common than is usually supposed. I have three cases in mind which I labeled subglottic edema in children. Two were treated in the routine way, as though diphtheritic; the antitoxin made no difference, but in two cases in particular there was a copious flow of serum immediately upon the introduction of the tube, and there was such a quantity that there was no mistaking it. Diagnosis with the mirror I have also made, and I would take issue with the method of treatment as stated by Dr. Richardson. I think the proper line of treatment should be copious diaphoresis; if we could establish this when sure of the diagnosis, it is the best remedy. In one case where the diagnosis was made with the mirror, this treatment was very promptly successful.

Dr. Charles W. Richardson, Washington: I wish first to endorse what Dr. Casselberry has said. He suggests passing the mirror into the pharynx and raising the epiglottis in order to get a rapid view.

Really, although Dr. Hubbard thinks his treatment differs from mine, he agrees most thoroughly, because my method of treatment also produces diaphoresis.

Recurrent Lymphomata of the Laryngopharynx—Presence of Streptococcus Hemolyticus in the Growths Excised and in an Associated Sphenoethmoidal Discharge—Autogenous Vaccination—Arrest of Recurrence—Recovery.

By W. E. Casselberry, M. D.,

Chicago.

A causal relationship between nasal sinus disease and tonsillar and other lymphoid enlargements of a certain type, believed prone to affect parts over which the discharge flows, is substantiated, to the extent at least that manifold extreme enlargements of isolated lymphoid glands of the laryngopharynx were found to have been excited and maintained in chronic form by infection with streptococcus hemolyticus derived from a sphenoethmoidal discharge which contained the same organism. The fact is significant in connection with the modern conviction that rheumatoid, cardiac and pyemic diseases lead out from local foci of infection, as it shows the necessity of searching for the focus "higher up" than the tonsils, since tonsillar infection itself may be secondary to nasal sinus disease. It supports also the conviction that secondary infection is the cause of the gross hyperplasia of the follicles in the fossa of Rosenmüller, and of the lymphoid infiltration of the folds of tissues about the eustachian tube, which are observed in connection with sinus discharge, and which lead to deafness by obstruction.

The term lymphoma is used synonymously with infectious lymphoid swelling. In size and shape they were not unlike clusters of large white grapes, ranged on each side of the laryngopharynx, where they filled the pyriform sinuses, overrode the arytenoids and encroached upon the lumen of the larynx. There were in all six separate and distinct growths arranged in three pairs. Each of the upper pair consisted of two lobes, one above, the other below the side of the epiglottis, and was attached to the pharyngoepiglottic fold. The middle pair, somewhat smaller, was attached to the aryepiglottic folds, and the lower still smaller pair to the arytenoids; the latter suggests that other instances of slighter degrees of hyperplasia about the arytenoids, observed in sinus suppuration, and classed as chronic laryngitis, really represent secondary infection of the lymphoid glands by the sinus discharge which gravitates to that situation.

The faucial tonsils having been totally enucleated years before, would have caused the upper pair of lymphomata, only their upper lobes at first being visible, to have been mistaken for compensatory growths, were it not unprecedented for the isolated follicles in the laryngopharynx so late in life as fifty-four years of age, to develop spontaneously without definite cause into overgrowths so unusual in multiplicity, size and situation.

Meanwhile the microscopist reported: "A simple hyperplasia of lymphoid tissue corresponding to that of the tonsil. No evidence of malignancy." And the bacteriologist reported the presence in the tissue, in large numbers and almost pure culture, of streptococcus hemolyticus, the same organism which recently had caused endemics of severe acute infection of the throat and cervical lymphatic glands, and reported also that the sphenoethmoidal discharge contained, among others, the same organism.

Nine months from the start the dyspnea, choking spells and impairment of voice required surgical relief, and all but the right one of the middle pair of growths were removed. But they soon redeveloped, despite external exposures to the X-ray.

It was in face of this discouraging prospect that hopes were centered upon autogenous vaccination. All other treatment was suspended, and despite the fact that one of the middle pair had not yet been removed surgically, it was now let remain to serve as a gauge by which to mark the efficacy of the vaccine. Its successful effect furnished practical confirmation of the infective origin of the growths. The result of the first dose was comparable only to that at which one marveled in the early days of diphtheria antitoxin. The change commenced within twelve hours, with relief from irritation in the throat, and was marked within two days by a visible diminution in size of the lymphoma which had been let remain as a gauge, and of the large recurrent growth at the site of the first one removed. The further recession under biweekly doses was uninterrupted down to a practical and permanent disappearance of all the growths in about six weeks.

DISCUSSION.

Dr. Joseph L. Goodale, Boston: I am very much interested in this case, as I am reminded of one which I saw several years ago, and which I reported the following winter in Philadelphia, which bears certain resemblances in this respect. A woman whom I was asked to see showed an enormous enlargement with induration of the left tonsil, the induration continuing behind the tonsil and without any sharp line of demarcation to the base of the tongue and down the vault to the larynx, rapidly increasing so that from the beginning of the symptoms to the time when I saw her it had produced actual dysphagia, and the question was whether we should do a tracheotomy or remove the growth, and in examination under ether the growth was found so extensive that we decided to let her come out. During the next week, although we had practically decided the condition was hopeless, we endeavored to excite an autogenous vaccination by the injection of turpentine under the skin. That was perhaps the wrong thing to do. At the same time we gave her the staphylococcus aureus. The result was that within three days she was able to swallow. Within a week she could breathe perfectly. This was in May; when I went away the last of June she had left the hospital, and examination showed nothing in the situation of the former growth. When I saw her again in the autumn the site of the growth was represented by a stellate cicatrix. She then disappeared from observation; I saw her last spring; she has been in perfect health, no difficulty of any sort, but at present there is not the slightest sign of lymphoid tissue in the tonsil fossa. It looks as though a complete and beautiful enucleation had been performed.

Dr. William E. Casselberry, Chicago (in closing): The sphenoethmoidal discharge during the course of the treatment diminished tenfold. It never was entirely eradicated, but it is now so slight in comparison that the patient esteems it as not one-tenth of its previous quantity. There has been no further treatment.

With regard to the removal of the growths, the upper ones were done without a mirror, by extreme depression of the tongue with the patient's head directed upward, getting hold of the growth with a volsellum and pulling it up and getting the snare up. The fourth was done in much the same manner, but under the mirror. Grasped first with the volsellum under laryngoscopic observation, and then the snare put over it also with laryngoscopy. The patient started to gag, the mirror was removed, and under traction the snare was drawn home. The others were simple enough to do without traction under laryngoscopic observation.

The Use of Radium in Papilloma of the Larynx in Adults.

By F. E. Hopkins, M. D.,

Springfield, Mass.

Dr. Clark's paper, read before the Association in 1905, brought out very clearly the tendency to spontaneous disappearance of papilloma of the larynx in children when the age of active growth has passed; but the tendency toward recurrence is more persistent and is a more desperate one in the adult. Radium has been applied directly to the larynx in no great number of cases as yet, but with some positive cures reported. More than a single application may be necessary, and burns from too long exposure with consequent adhesions and contractions are possible. Caution is advised as to the length of exposure when a powerful tube is used, and a necessity for more than one application is to be borne in mind.

Report of a Case of Septic Infection of Parotid Glands.

By F. E. Hopkins, M. D.,

Springfield, Mass.

Structure and anatomic relations account for the prominent symptoms attending great swelling of the parotid gland. Each intralobular duct is a branch of a subdivision of the main duct, so that if a septic infection results in closure of these ducts, drainage is impossible and dissection of the gland becomes necessary. Many important vessels and nerves, including the facial, traverse or originate within the substance of the gland, making dissection difficult and dangerous. The gland lies in contact with internal jugular vein and internal carotid artery and the pneumogastric, glossopharyngeal and hypoglossal nerves; and pressure of the distended gland causes corresponding functional disturbance. Suggestions for treatment are early probing of Steno's duct and efforts to reduce inflammation, which failing, dissection of gland becomes necessary.

DISCUSSION.

Dr. Henry L. Swain, New Haven: Dr. Abbe stated in New Haven recently, in speaking of the treatment of tumors by radium, that he had one case without recurrence after five years. It has occurred to me since I have been using suspension laryngoscopy, that we have in it an admirable method of exposing these papillomata over long periods to radium. The patient is hung up with an anesthetic, and kept so comfortably for so long a period that we can radiate them at our pleasure. Dr. Mayer exhibited patients under suspension laryngoscopy. The other day I had a case hung up for over an hour with insufflation anesthesia through the nose, breathing perfectly and without any after-discomfort.

Dr. D. Bryson Delavan, New York City: Radium is especially applicable to superficial growths, and papillomata of the larynx are very frequently of this class, and should be susceptible to relief from the use of radium.

Without some such help as suspension laryngoscopy, it is practically impossible to make an exposure of the radium for sufficient time to answer the purpose. I have had under observation for six or seven years a little girl, a case of Dr. Abbe, whom I began to treat with him when she was about five years of age. I refer to the case, not because it has been an inveterate case of papilloma, but because the radium has not been as effective in this instance as in almost every other case I have seen, and I would particularly refer to one result—not of the radium treatment, but one which has followed in the case perhaps from influences due to the growth itself—that is, the distinct contraction, especially of the epiglottis; a contraction so marked as to be quite unusual. There still remains a large mass of papillomatous tissue at the base of the epiglottis, and the child still is able to breathe most of the time through the mouth, but is occasionally forced to resort to the laryngeal opening, which is kept packed. The contractures which have arisen are worthy of attention.

Dr. Frederick E. Hopkins, Springfield (in closing): I think I may fairly say that my conversation with Dr. Abbe makes me feel one can speak much more positively about the efficacy of radium than I felt warranted in stating from my own experience in my one case. He has used it for fully ten years, and has many cases of undoubted cure. The woman referred to, who was treated so long, has since died, but she lived for three years after the application of radium, dying with pneumonia, I believe, and during that period of three years she breathed comfortably, with no recurrence of the growth.

The Influence of the Nose on Eye Affections as Evidenced by a Case of Bilateral Blindness and One of Unilateral Scintillating Scotoma Cured by Operations on the Ethmoid Cells.

By Hanau W. Loeb, M. D.,

St. Louis.

Case 1 was that of a boy who was practically blind, the vision being reduced to 1/192 on the right side and 3/120 on the left side. The sight had been gradually failing for three weeks. This was accompanied by severe supraorbital headache. Exenteration of both ethmoids was followed by complete restoration of vision within one week, improvement being gradual from the time of operation.

Case 2 was that of a girl, sixteen years of age, who had been suffering for two years from daily attacks of severe left-sided headache, with what she described as flashes appearing in her left eye. These attacks lasted for about five minutes, coming on without any apparent regularity during the day, and without any cause ascertainable on the part of the patient. Exenteration of the left ethmoid resulted in complete cure, the patient having suffered with only a mild attack on the day of the operation.

Dr. Loeb thinks that these cases, in which the ethmoid and not the sphenoid was at fault, may confirm his investigations on the anatomy of this region, to the effect that under ordinary circumstances the optic nerve is in close relation with the ethmoid labyrinth only at the postero-external angle of the last posterior cell. Where this relation exists, there is only the slightest possibility of any danger to the optic nerve in suppuration confined to the ethmoid cells. But when the last posterior ethmoid cell replaces the sphenoid, the optic nerve runs close to and along the external wall of this ethmoid cell (as in two out of thirty specimens studied), and the vulnerability of the nerve is correspondingly heightened in view of the greatly increased portion exposed.

DISCUSSION.

Dr. Joseph H. Bryan, Washington: In my experience it is the posterior ethmoid cells which are most at fault at the juncture of the sphenoid, or the posterior ethmoid cell operating on the optic nerve as it comes through the canal. These cases where the wall between the sinus and the orbital cavity is very thin, naturally may be due to some pressure effect, but when distantly situated, with considerable bone between the cavity and the nerve, it is rather difficult to explain, unless due to toxins, and it is my belief that there is some transmission of the septic matter to the nerve tissues which bring about these changes.

Dr. John F. Barnhill, Indianapolis: In a study of this question I came across a specimen which was unique. I could well believe that anything could happen to the optic nerve in a case of ethmoiditis posterior in such an instance. The specimen shows that the whole optic canal runs entirely through one of the posterior ethmoidal cells much as would a sewer drain run through the ground. It is attached at the base of the cell, and with three-quarters of the circumference of that osseous tube runs directly through. It seems incredible, looking at the very thin bone which surrounds the bones throughout this half inch in length, that if this cell were filled with pus and the drainage impeded, such an eye would not be affected in some way, as Dr. Loeb has explained.

Dr. B. Alexander Randall, Philadelphia: I have seen a good many of these cases, some of them of great interest; but all of these where the scotoma was scintillating, I have seen to be distinctly toxic in type and not dependent on anatomic relations. I have seen the blindness and fixed scotoma quite marked with marked swelling of the optic nerve.

Dr. Hanau W. Loeb, St. Louis (in closing): Ethmoid disease is more common than sphenoid disease, and when the latter sinus is affected the ethmoid is also, especially in the acute conditions. I found in these anatomic studies that this last posterior ethmoid cell at its posteroexternal angle came the nearest to the optic nerve. Knowing, as we do, that the orifice of that is low down and almost always empty of pus, with that slight relation it would not affect the nerve to any considerable extent, even if it is possible for the nerve to be affected by nearness. However, in two cases out of the thirty specimens, this nerve, instead of having that relation, on account of the ethmoid cells being pushed back over the sphenoid ran along the posterior ethmoid cell and along its lower portion, and was in a far more vulnerable position than before. Onodi has ascribed to the toxic condition the cause of optic troubles, or to the veins. Toxic conditions can act more accurately under these conditions than when distant. The anatomic relations of these structures have shown that this condition obtains.

Too Optimistic Rhinology.

By B. Alexander Randall, M. D.,

Philadelphia.

Important, often essential, as is rhinology to laryngology and otology, it is often inadequate and must be supplemented by strictly ear treatment in ear cases, where exhaustive diagnosis may show other conditions, such as nerve deafness, outweighing the catarrhal phases. The aurist sees many cases harmed rather than helped by rhinologic treatment alone. "It is a narrow and distant view of the ear that is gained with the throat mirror only."

The catarrhal process originating in the nose and nasopharynx may be impossible to cure unless these be put in order; but may progress unchecked, or at least persist, despite the best work here. Deafness sometimes clears up after adenoid removal; but "signing the pledge will not cure a hobnail liver."

Intrinsic Cancer of the Larynx; Complete Excision Apparently Effected by Endolaryngeal Operation.

By St. Clair Thomson, M. D.,

London.

The treatment of intrinsic cancer of the larynx by laryngofissure is remarkably satisfactory.

The writer never lost a patient by operation, and 80 per cent have remained free from recurrence; similar results were secured by Semon and Butlin.

Thomson records his first case of endolaryngeal cancer that he has treated in a woman, aged fifty-three, hoarse for eight months.

The right vocal cord, from the anterior commissure back to the vocal process, was replaced by a reddish cauliflower growth, interfering somewhat with the movement of the cord.

Under cocain, with a large Mackenzie forceps and the indirect method, as large a piece of the cord as possible was evulsed. It proved to be epithelioma.

Some time later anesthesia was induced by intravenous infusion of ether and hedonal. Laryngofissure; removal of the right cord ventricular band with their perichrondrin together with the vocal process of the arytenoid cartilage. Examination of this mass showed no evidence of epithelioma, indicating that the entire diseased mass had been removed at the first operation.

This writer concludes:

1. Cancer of the vocal cords in the early stages is strictly limited and very slowly progressive.
2. Diagnosis is based chiefly on inspection of the larynx. Where the growth is superficial and not infiltrating it can be confirmed by microscopic examination.
3. The growth may be completely removed endolaryn-

geally, even when it occupies the entire length of a vocal cord.

4. Laryngofissue is the operation of choice in all cases of endolaryngeal cancer, is not a dangerous operation, and offers the best prospects because the disease remains superficial and limited for a time; and finally, there is a lasting cure in 80 per cent of the cases. The value of indirect laryngoscopy is strongly insisted upon as being far gentler than the direct method, and it is hoped that the rising generation of throat surgeons will continue to practice the indirect method.

The anesthesia given in the case cited, while perfectly ideal from the operator's point of view, gave much anxiety subsequently, as it was difficult to rouse her for twenty-four hours after. In recent cases he has returned to chloroform.

DISCUSSION.

Dr. Charles W. Richardson, Washington: The laryngofissure claims to have its origin from Dr. Sanger of Berlin, but the first I heard to mention that manner of removal of laryngeal growth was Dr. J. Solis-Cohen. Whether he is the originator of it he can tell us.

One case which I have had is now five or six years without any recurrence. Most of my others have had recurrence, but singular to say, only one of recurrence in situ. There were secondary develpments in other portions of the body to which they have succumbed. I have had two this winter—one that I operated on in the latter part of November or December, and as I had to go down quite far into the cricothyroid membrane in order to insure absolute removal in normal tissue, there has resulted some stenosis. This has been intensified by the fact that I had a hemorrhage at the end of operation; not a very severe one, but a persistent oozing in the lower corner between the arytenoid and the lateral wall of the thyroid cartilage, requiring opening up of the wound and watching of the hemorrhage for some little time. As a last resort I had to use chromic acid, which also produced considerable softening and necrosis of the left wing of the thyroid cartilage, which no doubt has produced this stenosis. He is wearing an intubation tube and is perfectly comfortable without any recurrence, but is so distressed at his inability to get rid of the tube that he has gone to consult some of my colleagues at Johns Hopkins.

The second case of this year was identical with the first, and there was an identical hemorrhage which was controlled much earlier than in the first case. After I had controlled the hemorrhage and waited about half an hour, I returned to the man to see if he was perfectly safe to leave, and I found that he did not seem to recognize me, or show any interest in anything. In picking up his hand to feel his pulse I noticed the left arm was apparently inactive, and testing further I found the left arm and leg both inactive; the right side was free! Three or four days later he died from his hemiplegia; no postmortem was obtained. He was a man of seventy years, and probably this was a natural sequence in such a case. All of my cases I have operated on without primary tracheotomy, simply laryngofissure according to the technic suggested by Cohen, splitting the larynx and making the mucoperichondrial separation so far back as the growth extends in every direction and cutting off the mass.

Dr. J. Solis-Cohen, Philadelphia: I have done a number of these operations and have never seen a recurrence. I learned to split the larynx from our old member, Ephraim Cutter. I saw him in Boston take out a large epithelioma in 1867. This man lived for twenty-five years and died of apoplexy.

My operation differs a little from his. I cut down, make the incision through the perichondrium all around the growth, and then with a blunt elevator lift the parts up. Then with a curved serrated scissors the whole mass is taken up, perichondrium, mucous membrane and growth, and the growth itself is not touched at all with any instrument. I have done preliminary tracheotomy in my earlier operations, but I have done one or two cases without. I prefer preliminary tracheotomy because I think it is well to get the patient accustomed to the use of a tube in case this becomes necessary later. All my operations were performed under chloroform.

I heartily endorse the conclusions that have been presented in the paper, both as to the ease with which certain classes of growth are removed by intralaryngoscopic method, and the conclusions that have been arrived at by the writer.

Hemorrhage has been insignificant in my cases.

Dr. Emil Mayer, New York City: As a new contribution to the question of anesthesia I would like to call attention to the anesthesia proposed by Gwathmey of the injection of ether into the intestinal canal, producing a perfect anesthesia, the excess being drawn off after the operation. This is still in its infancy, but is very well spoken of, and it may be possible that in this we have a newer method of producing anesthesia, avoiding the necessity of a preliminary tracheotomy, and operating under ether.

Dr. D. Bryson Delavan, New York City: Again, I am proud and happy to know that America is still in the lead, but as to the subject of thyrotomy it is necessary to mention the name of Clinton Wagner, whose cases in the '80's show a comprehension of the subject and success in relation to it which is deserving of recognition today. With regard to the recurrence of malignant disease in these cases after operation, it is quite true that recurrence is unusual, yet I have seen several cases in which it has taken place. There is one case in particular, of primary epithelioma of the epiglottis, in which the disease was apparently far and widely removed, in which the patient lived for nine years without recurrence, then it took place and he succumbed. The fact that recurrence does not take place in many cases cannot insure the patient against it. It seems possible to me that where it should take place is in the cases that have not been appreciated as of the severe type, or else that the operation has not been thoroughly performed, but in the main the experience has been such as that stated in the paper and by Dr. Cohen.

Dr. T. Passmore Berens, New York City: I wish to lend emphasis by referring to this case of Sir St. Clair Thomson. He said he had removed his growth entire by the indirect method. In a case that I reported about six or seven years ago, at the same time Dr. Richardson had his, I also removed the cancer entire by the indirect method. There was so much induration following the operation that I did a laryngofissure and hemilaryngectomy, removing the whole wing of the thyroid. The growth I found during the laryngofissure proved to be simply inflammatory. The cancer itself was removed by the indirect method. The man has made a perfect recovery. A patient should be prepared for operation by being taught to lie on his stomach, well over toward the side of the bed, with his elbow on a chair and taught to swallow upward. This has added greatly to the comfort of the patient, and I believe, also to the quickness of their recovery.

Dr. Greenfield Sluder, St. Louis: I would like to add a final word in the form of a plea for the indirect method. I personally regret exceedingly to hear it spoken of as a lost art.

Dr. Harmon Smith, New York City: I think we are indebted to St. Clair Thomson for giving us the history of this peculiar and interesting case. It is not always that our foreign confreres are willing to submit to our consideration and discussion their most important and unique cases. This is a comparatively young woman, removal by the indirect method, although an accident, being complete in its character, recurrence of a granuloma which to the majority of us would simulate a recurrence of the growth, his absolute faith in the pathologist that it had been removed thoroughly, not losing his head and removing the large mass which recurred, all these points seem factors that stand out prominently in the history of this case.

Dr. John E. McKenty, New York: It seems to me, so far as my experience goes, that in small unilateral growths of the larynx laryngofissure is sufficient, but where the growth is at all progressive or extensive or growing fast, I am in favor of removing not only the growth, but the cartilage underlying it, either taking a wide section out of the larynx or doing a hemilaryngectomy. I do the tracheotomy and the hemilaryngectomy at the same time, and in that way may probably be going against the experience of others, as it is generally considered better to do the tracheotomy first; but if done through a small incision just above the suprasternal notch, and the laryngectomy through an incision which does not connect with the fissure below, there is not much trouble. Another point, to prevent inhalation pneumonia, is that after doing the hemilaryngectomy I pack the trachea tight down upon the tube with vaselined gauze impregnated with bismuth, then I use a small drain into the larynx brought out at the lower corner of the laryngofissure wound. In that way the larynx is drained of secretion, and this secretion is prevented from getting into the lung and causing pneumonia. I do not believe the position in bed is sufficient to prevent this when the larynx is closed after hemilaryngectomy. The drainage is removed from the larynx in two days, and the gauze packed down on the tube is removed also and the intubation tube taken out four days after the operation. I have had four cases prior to two recent ones, of which I will not speak, in which the patients made excellent recoveries, and have been able to talk in a loud whisper. I think we ought to be very proud of the fact that Dr. Solis-Cohen has opened the way of doing laryngofissure and has given us this excellent operation in cancer of the larynx. Anything that will avoid total laryngectomy is a Godsend. I saw in a clinic abroad two years ago thirteen total laryngectomies, and the patients were in many instances in a pitiful condition. The operations were all successful so far as the immediate result was concerned—the Gluck operation was done—but the pathetic condition of the patients struck me that life would hardly be worth living after a total laryngectomy, and if we can get results by an early operation, such as Solis-Cohen and Sir St. Clair Thomson have told us of, we will be very glad to adopt these methods instead of the more radical ones.

Endonasal Operation in Tumor of the Hypophysis—Report of a Case in a Female Nine Years of Age.

By T. H. Halstead, M. D.,

Syracuse.

The patient first seen February 6, 1914. The prominent symptoms were adiposity, frontal headache, impairment of sight, tiring very easily, muscular fatigue, marked ataxia, dizziness, intention tremor, extreme difficulty in making coordinated movements. Skin dry and coarse, hair black, coarse, growing low on forehead. She was mentally acute, described as being almost brilliant. There was an increased tolerance for sugar, no glycosuria after 200 grams glucose, slight pyrexia. The eyes showed 6/9 + each eye, sight occasionally obscured, fields normal for form of each eye, color fields normal. Pupils large, in dark room no reaction to light, but in very bright light moderate change. Reaction with convergence normal. Muscle balance normal.

Patient is short, thick set for her age, tendency to adiposity, particularly about hips and abdomen, facial expression flat and ironed out, well marked general ataxia, marked choreiform movements, marked athetosis, decided intention tremor, some deafness but not persistent.

X-ray examination—stereoscopic plates—showed sella turcica somewhat larger than normal, bony outlines irregular and not as clear cut margins as other outlines in this area. Above and posterior to sella is a brain area of lessened density, fairly well defined, the anteroposterior diameter one and one-half inches, vertical about one inch. This area seems to surround the sella turcica, the interpretation being a soft growth, possibly a cyst, surrounding and pressing upon the pituitary body. The diagnosis was a cyst either of the hypophysis or a neighborhood cyst pressing upon the hypophysis, the optic thalamus, corpora quadrigemina and contiguous regions forming the interpeduncular space.

Preliminary operation March 13, 1914, upright position, cocain, adrenalin. Removal of both middle turbinates and exenteration of right anterior and posterior ethmoidal cells.

Second operation, anesthesia, local, submucous resection of the septum, entire septum, vomer, perpendicular plate of ethmoid and the rostrum of the sphenoid were removed. Anterior wall of both sphenoid and sphenoidal septum removed.

Nineteen days later third operation, posterior third of the soft,. bony septum removed, then the bony sella, the dura incised, and there was an immediate gush of more than a half ounce of yellowish fluid.

During the week following the last operation there was a very marked change in her condition for the worse. Frontal headaches increased, shrieked a great deal, much stupor, dull, apathetic, involuntary urination, polyuria, two tonic convulsions, pulse irregular and thready, respiration at times slow and of Cheyne-Stokes type. At end of a week, following the convulsions, gradual improvement began, a very marked improvement in the ataxia and athenoid movements being first noticeable, pupil contracting, headache less, but there was a decided change for the worse in her disposition. Loss in weight and in muscular strength very perceptible, involuntary micturition and defecation. This decided change in symptoms, some better, some worse, continued for three weeks, and seemed to be due to the relief of pressure in interpeduncular space, as shown by improved eye conditions, less headache, less ataxia and intention tremor, whereas there was seemingly now a condition of hypopituitarism instead of the hyperpituitarism when she entered the hospital. For four weeks it was noticed that her black hair was changing color rapidly to a reddish brown, beginning at the distal end of the hair and extending rapidly to the scalp.

She was now put on pituitary extract—pituitrin—when there began an immediate improvement in her mental condition, the child becoming bright, cheerful, singing happily, displacing the apathy and dullness following the last operation. Muscular strength showed an equal improvement. No complaint of headache. But ten days have elapsed since giving the pituitary extract, and the report of the case, consequently, too short a time to know how much real and permanent improvement may follow the operations.

DISCUSSION.

Dr. Lewis A. Coffin, New York City: I have operated two of these cases, practically doing the same operation that Halsted has reported, excepting that I take out the posterior part of the septum instead of doing a submucous resection. I took out the rostrum and got to the sphenoidal wall in that way. They were done in two or three stages. The first case was a woman, an idiot, that was referred to me from a charity hospital, and I operated her in three sittings. She was a poor patient under cocain, because she had no mentality, but I was successful in getting back as far as the sphenoid. I went into her sella and put her back in the ward. Her symptoms as to pain in the head improved, but her mentality did not. Some ten days after I had done the operation I felt more or less chagrin because I had not any of that tumor in a bottle for examination; it was a cyst, there being a gush of straw-colored fluid. It had become so easy to go into the sella turcica that I thought I would go in with curved forceps and get some of the tumor. I put her on the table under an anesthetic, and took Yankauer's right and left forceps, somewhat curved, and opened the sella turcica, closed my forceps, and took out what I thought was the tumor; there was a small hemorrhage. I packed right into the opening in the sella. I put her back in the ward feeling pretty well. Two hours later the patient was not so well. She was comatose, evidently from brain pressure. I removed the packing, but she died that night. Another case was sent to me from the eye clinic of the Manhattan Hospital, a young girl of seventeen, who had complete blindness in one eye and temporary hemianopsia in the other, with extreme and constant headache. I operated under cocain, removed the posterior half of the septum, opening the sphenoid, and took down the sphenoidal septum under cocain. I then, instead of inserting a plate, took her up to the X-ray room, and took a periosteal elevator and slipped it into the sphenoid, and without any light whatever, and put a little adhesive around it to hold it under the X-ray, and found the periosteal elevator was exactly where I wanted to enter the sella turcica; I then put her back on the table, opened the sella, could see the tumor very well indeed, but could not get any tissue. It seemed to break down, and I was not so ambitious to get any of it in a bottle as I had been before. However, just as she went back to the ward I took a curette and slipped it in there and put her back in the X-ray room and X-rayed her under ether, which showed my curette in the middle of the pituitary gland. That girl improved very much, not in vision, but her headaches disappeared. The interesting part is when she had gone out of my hands. She was coming to me for probably three or four or six weeks; she felt very much better; Dr. Sharp, who is consulting neurologist to our hospital, who worked for a number of years with Dr. Cushing, said we were not warranted in doing anything further for her. I was looking for a case where I could do the Frazier operation, but this was not justified in this unless her headaches returned. Her sister, however, wanted her vision improved, and took her to several other men. Dr. Elsberg, Dr. Charles A. Dana, etc., saw her in the course of time. I asked Elsberg if he ever operated her to notify me, and some two weeks later he sent me word he was going to do the Frazier operation. I went to see the operation. I was delighted with his wonderful and beautiful technic. He did not, however, remove more than the size of a grain of rice. I do not know her recent history.

Dr. Cornelius G. Coakley, New York City: I saw one case operated on of a man who was totally blind in the left eye, with hemianopsia on the opposite side. Elsberg did the operation, a decompression, but a decompression above the optic nerves. If you are going in for decompression you have your growth below the optic nerve, and pushing the nerves upward, and here semiclassical decompression is of far more value than decompressing the lower portion of the floor of the frontal lobe. The Frazier operation is not so satisfactory as the Hirsch or Cushing, or as the regular decompression operation.

Dr. Harry L. Swain, New Haven: I too have seen an operation and assisted at one for pituitary tumor in the hands of a general surgeon. What impressed me was the smallness of the view of the tumor mass. The operation was done skillfully enough; the nose was taken off at the face and turned up to the forehead, and fastened with towels, and the septum taken away, set back, the sphenoid opened, and the septum between the two sphenoidal sinuses taken away, and a good operative field cleared up. When all is considered, the range of light in surgical amphitheatres is not enough for a clear view of the further wall of the sphenoid to enable one to open into the sella turcica. The first stroke of the chisel opened into the sella turcica, and enough was chipped out to enable us to look through at the cranial cavity; there was a growth, not a cyst, of organized tissue, and it was supposed to be a glioma, although this would be very rare in this situation. There was immediate improvement in vision after the operation,

but on the night of the second day she developed a combination of edema of the brain and pressure from that, with rise of temperature, edema of the lung, and cessation of the kidney function, and died. During the first twenty-four hours, while still in possession of her faculties, there was a marked improvement in vision as a result of simple decompression, because I doubt if the mass of tumor taken away in itself was sufficient to have relieved the pressure enough to improve the symptoms.
grammes glucose, slight pyrexia. The eyes showed 6/9 +
to Dr. Coffin's question, I think the field was better after the taking off of the posterior end of the septum, and in fact, I first started to do what he had done, not the submucous resection, but I got cold feet. I knew what Hirsch had done, and thought I would stick to that operation. I am sure that the field which I got the third time, when I took out the posterior end of the septum, was better than at the second operation.

I do not know regarding the comparative possibility of sepsis. This child that we thought was going to die after the second operation, developed a tonsillitis with a temperature of 103 degrees, and finally pulled through.

Chronic Influenza of the Nose and Throat.

By Lorenzo B. Lockard, M. D.,

Denver.

At various times cases have been recorded in which influenza bacilli, either in pure culture or in symbiosis, have been found during a period of several months, and in some instances for as long as one and two years.

Usually these have been cases of chronic bronchitis, pneumonia or tuberculosis, although a few have concerned individuals with rhinitis and otitis media.

The patient whose history is recorded presents the unique spectacle of an infection of the nose and throat lasting twelve years, during all of which time cultures of the bacillus influenzæ have been obtainable whenever sought for, whether or not subjective symptoms of the disease were present.

In 1902 he had an attack of influenza, which terminated in a peritonsillar abscess; the pus showed bacillus influenzæ. During the next two years three swabs from the tonsillar crypts gave similar findings.

In 1909 his tonsils were removed and after three days a false membrane appeared covering the pharynx and pillars. A culture from this showed the bacillus. In the following two months three positive cultures were obtained. An autogenous vaccine had no effect. Three years later, following an attack of typhoid fever, there developed acute inflammation of the maxillary sinus, the pus from which gave a pure culture of the bacillus influenzæ. There was a second attack six months later, with the same bacteriologic findings.

A third attack developed the following winter, when a radical operation was performed, and again the influenza bacillus was found. Three months later an abscess appeared over the second bicuspid. This tooth and the first molar were extracted and the necrosed portion of the floor was resected. A pure culture was obtained from the extracted tooth. Five months later the bacilli were still present.

The literature fails to show a similar case, although cases of chronic infection have been described by several authors.

Bacilli are found in the throat secretions of many normal individuals, and in a large percentage of patients suffering from other diseases. In 172 normal individuals the bacillus was found 43 times, and in 427 patients with other diseases it was present in 215.

Following attacks of influenza bacilli may remain latent in the throat, bronchial tubes or nose, and give rise to recurrent attacks in the individual or transmit it to others. In this way may be explained the eruption of sporadic cases in nonepidemic periods.

For the diagnosis of chronic influenza the finding of the influenza bacillus is not essential, as the symptoms are characteristic. No treatment aside from that which depends upon raising the resistance of the individual has been effective.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of March 13, 1914.

DR. A. P. VOISLAWSKY, PRESIDENT.

A Case Showing Spontaneous Radical Mastoid on Left Side and Acute Labyrinthitis With Facial Paralysis on Right Side.

DR. LINN EMERSON: The patient shows two conditions. On the left side she gives a history of having had an abscess behind the ear some fifteen years ago. A general surgeon made an incision and pus was evacuated. That was all that was done. She has an opening now behind the ear which is as nice a radical as any one could do. A probe can be passed up into the middle ear without difficulty.

Dr. Emerson said that the patient came to him two days ago to consult him regarding a right-sided facial paralysis. The condition had improved somewhat since then. He questioned her regarding the ear, on that side, and ascertained that she had had a suppurative otitis for the last three months. She was slightly tender over the mastoid on deep pressure. She also stated that about twelve days before, she had been very sick, with what she termed was some sort of ptomaine poisoning, during which attack she vomited profusely and was in bed for three or four days. Her physician diagnosed it as a case of intestinal toxemia and treated her accordingly. She got better, and then suddenly, three days ago, this facial paralysis developed. Dr. Tymeson examined the ears carefully with various tests. The right side shows a dead labyrinth, and she was presented for suggestions regarding treatment—whether, in view of her recent condition and the improvement of the facial paralysis, it would not be better to postpone operation for a while, rather than to run the risk of setting up grave complications. The ear shows nothing but a boggy damaged drum.

DISCUSSION.

DR. TYMESON, replying to an inquiry regarding the functional tests made, states that on the side where the spontaneous radical occurred, the patient hears a 128 tuning fork and has a positive Rinné. On the other side the bone conduction is faint, and he is quite sure it is referred to the left side. The Weber is positively localized to the left. He was convinced that she was totally deaf on the right side. The point on which suggestions were particularly desired was the advisability of doing a radical mastoid operation on the right side, or letting the patient alone. The facial paralysis had improved and the labyrinthitis seemed to be quieting down.

Dr. Alfred Braun asked Dr. Tymeson whether a noise apparatus was used in making the tests for hearing, and how the caloric test was done.

Dr. Tymeson said that no noise apparatus was used, and that hot water was used for the caloric test.

Dr. Braun then stated that it is impossible to make any prognosis or to set the indications for treatment unless positive information is had as to whether the labyrinth is dead or not. Hearing tests are of no value without a noise apparatus. A hot water caloric does not give us positive information unless the water is so hot as to be painful. It should be at least 112° to 115° F.

Dr. Tymeson said that the water of 115° F. had been used.

Dr. Braun stated, further, that it was rather unusual to get a facial paralysis, due to necrosis, in an ear which had been suppurating for only three months. A facial paralysis in an acute ear is not due to bone necrosis and is no indication of labyrinthine involvement. If it really were a chronic ear, with a facial paralysis due to necrosis, he would certainly do a combined radical and labyrinth operation. A radical alone should not be done. This is a dangerous procedure, as it may cause an extension of the labyrinthine infection to the intracranial structures.

Dr. Blackwell said that he had seen one case which was operated upon six weeks ago, and three weeks after the radical operation the patient developed a facial paralysis, due to exposure to cold while riding against the wind in an automobile, but it improved rapidly after a few days. Possibly the condition of Dr. Emerson's patient was due to the unusually cold weather we have been having.

Dr. Voislawsky, referring to the spontaneous radical which occurred on the left side, said that he had seen several of these cases, and that two had been presented at the Academy in the last ten years, but, as he recalled them, each was specific. It might be well to have a Wassermann test made in this case.

Paper: Two Obscure Cases of Resolving Mastoiditis—The Operative Indications.*

By Hugh B. Blackwell, M. D.

DISCUSSION.

Dr. Dixon said that he was very much interested in X-ray work just now, although it was quite a while before he was convinced of the value of skiagraphs of the mastoid. During the past two or three years, however, he has been doing a good deal of this work, and there seems to be only one reason for discontinuing it—i. e., inability to read the plates. He has been very much astonished, during the past year, to learn that some of the largest and best clinics in the world have discontinued the taking of skiagraphs of the mastoid.

In Dr. Blackwell's first case, he was inclined to think that the trouble was not in the mastoid but in the attic, and that the patient's head symptoms were due to a low grade meningitis. Any one who has seen any considerable number of temporal bones will remember that in a certain proportion the tegmen is likely to be very thin. It is often so thin that there is no bone at all in probably two-thirds of the tegmen tympani, and sometimes also the antrum.

Not long ago he had made an autopsy on a case which seemed to bear on this point. The patient had a meningitis, and, fortunately, an autopsy was secured. A mastoid operation was performed. An X-ray had been made. He could not recall its reading, but he had not favored operation. The symptoms, however, became so urgent that the operation was undertaken, and a normal mastoid was found. The girl promptly developed a meningitis and died the next day. Nothing was found to account for the meningitis until the tegmen tympani was reached. He did not quite like the looks of it, so removed the dura, whereupon the knife slipped into the attic. There was not the slightest doubt that, in this instance, the meningitis came from the attic; and no person who does a simple mastoid is going to clean out the attic.

In regard to the second case reported by Dr. Blackwell, that is a common experience now. Dr. Dixon said that there are quite a number of these cases, and they are not at all difficult to pick out after they have been carefully X-rayed. One case, seen about three or four months ago, that of a man about twenty-eight years old, presented absolutely no symptoms excepting a little uneasiness, such as Dr. Blackwell had described. The fundus was absolutely normal. The patient had given a history of otitis media, but there was nothing except a slight tenderness over the region of the mastoid emissary vein. The X-ray picture showed a probable softening or abscess cavity in that region. The young man was immediately operated upon, and the condition which was found corresponded to the interpretation of the plate.

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*See page 588.

Another case was skiagraphed on the 16th of February. At that time, Dr. Dixon had not noticed a very small shadow over the sinus, near the mastoid emissary vein. That man is walking about and attending to his business as usual, without paying much attention to his ear, but still under observation. He was X-rayed again today, and, without doubt, he has an abscess cavity at that particular spot, five or six millimeters across. He will be operated upon very soon.

Dr. Dixon said that he wished to call attention to one fact, although he was not altogether sure what importance is attached to it by surgeons in general; but we are learning a good deal from as well as about mastoid skiagraphy. For a while every bone that was found to be hard was regarded as being in all possibility of the sclerosed type, and due probably to long chronic suppuration. Then along came Mr. Cheatle, who called our attention to a number of specimens which showed that, in a large number of cases, an infantile bone and no cells is present on one side, and a pneumatic bone on the other side. Dr. Dixon stated that he had recently been following up a few cases, and had found that the old idea was pretty nearly correct. In one instance the patient came to the hospital, last September. He had a double mastoiditis: both sides cloudy, but at no time did he have sufficient symptoms to warrant a mastoid operation on either side. A number of plates were taken, and, as the condition was gradually clearing up, he was allowed to go out. He had a very large pneumatic type of mastoid on both sides. He returned in January, and both sides were X-rayed again. It was then found that the anterior part of both mastoids (around the antrum and a little below) was clearer, but all the rest of the cells were sclerosed. One could see old septa distinctly, but the bone was solid.

He comes in once a month for X-ray. The man is apparently well, but the process is still progressing. It may go on to complete sclerosis, as the outlying cells of the clearer portion are not quite so clear as they might be.

Dr. Dixon said that he would also like to speak of the matter of furunculosis. It is sometimes exceedingly difficult to make a diagnosis between severe furunculosis and mastoiditis. Many cases have been opened and found to be normal mastoids. There is this to be said: Every case of middle ear disease is a case of potential mastoiditis: the lining membrane of the mastoid cells is likely to be inflamed, and to that extent it is a mastoiditis, and you will obtain a small amount of haziness in the plate, which has to be taken into account. He then showed two or three plates, one of them representing a case of furunculosis on the right side. The left side was pneumatic and perfectly clear. The right side showed the infantile type, also perfectly clear. The furunculosis was treated and the patient got well without operation, although he had distinct symptoms of mastoiditis.

Another pair of plates showed a pneumatic mastoid on the left side, perfectly clear; the right was cloudy, and was diagnosed as a thick cortex with a perisinous abscess. Operation proved the reading to be correct.

Paper: The Treatment of Furunculosis of the Ear With Vaccines.*

By H. Beattie Brown, M. D.

Paper: The Use of Vaccines in Ear Infection, With Report of Cases Treated.†

By W. H. Haskin, M. D.

Paper: The Bacteriology of the Chronic Ear.

By James G. Dwyer, M. D.

DISCUSSION.

Dr. Wilson inquired whether there was any very marked reaction after giving the injections.

Dr. Brown replied that out of the seventy-five cases on the list—all of them working people—not one had lost an hour from work.

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*See page 600. †See page 582.

Dr. Quinlan said the section was certainly under many obligations to the readers of the various papers. They opened up a new field of thought as well as work for the thinking men of today.

The treatment of many of the chronic ear suppurations is attended with such anxiety and in so many instances with failure, that we are ready—perhaps too ready—to accept any balm for our disappointments in the past. It is to be hoped that the new days of progress may illumine our dark path, and that the vaccines may help us to do what the antitoxins have so well done for many other ailments to which they have been applied so successfully.

Dr. Myles said that the vaccine treatment, as presented tonight by the readers of the papers, was almost a revelation. Unfortunately, these things are usually taken up spasmodically, and the pendulum swings too rapidly, first one way and then the other. It takes a long time for us to get our balance, and there seems to be no way to do it quickly, unless it can be done by following the popular fashion and appointing a commission for the purpose. Of course, the commission would have to be unbiased and should take all the evidence.

What little experience he has had, even with the stock vaccines, has shown some remarkable results, and the method certainly deserves a thorough trial. Of course, there may occasionally be a death, but there are too many deaths following the extreme operative procedures. The papers presented tonight show that the method is well worthy of careful testing.

Dr. Blackwell said that, personally, he does not feel the radical mastoid is a dangerous operation, and he does not think it is so regarded by the majority of ear surgeons. He believes that often a modified radical operation would be sufficient, without subjecting the patient to the loss of hearing, etc., incidental to the radical procedure.

In regard to the number of cases treated, he understood Dr. Haskin to say that one hundred and eighteen cases were referred to him for treatment, and cultures were taken from only fifty-two of them. He wished to know why cultures were not taken from these other sixty-six cases.

Dr. Haskin replied that the sixty-six cases represented those who did not return and those who responded to treatment from the first. It was not thought necessary to go into those cases, but a large proportion of cases under careful treatment will dry up.

Dr. Blackwell: The writer stated that of fifty-two cases, in which cultures were taken, thirty-three were injected, and that eleven cases dried up under treatment before receiving vaccine, and seven did not return after the first treatment. so it could not be said whether they dried up or not.

Dr. Haskin: Eleven of the fifty-two cases were cured under appropriate treatment, before any vaccine treatment could be prepared.

Dr. Blackwell said that he did not see how Dr. Haskin could assume that the beneficial result was entirely due to the vaccine. Thirty-three received the same local treatment that the eleven received who were cured before vaccine was given. It would seem that the treatment which all these received was excellent, and that it must have had something to do with the beneficial results.

Dr. Hays asked whether there was any difficulty in making a vaccine, in those cases of mixed infection where there were a number of contaminating bacteria, which were liable to overgrow the more virulent organisms.

(This was answered in the negative.)

It seemed rather peculiar that a vaccine should be so successful in cases of chronic discharge from the ear, when one considered that they were of little use in chronic nasal sinus cases. Of course, in the subacute sinus cases one gets wonderful results by the use of vaccines.

Dr. Hays said that he wished to remind the members that about two years ago he read a paper before the ear section on treatment of chronic discharging ears by Dr. Yankauer's operation. Nearly all these cases turned out successfully, which he believes due, as was said tonight, to warding off the constant infections from the throat. In those cases where the discharge does not cease entirely, after a successful Yankauer operation, he thinks it would be advisable to use a vaccine.

In regard to the question of stock or commercial vaccines, Dr. Dixon might recall a case of furunculosis treated at the infirmary. When Dr. Hays first saw this man at his home he was suffering from multiple furuncles of the canal. He immediately had him transferred to the hospital, where it was necessary to incise these a number of times. For two years the patient had had a number of furuncles over the entire body, for which he had been treated with stock vaccine with absolutely negative results. Dr. Dixon prepared a vaccine from the pus of the furuncle in the canal, and gave this patient a number of injections with most gratifying results. He has not had a furuncle now on any part of his body for nearly six months.

Dr. Haskin made a point of the importance of taking the vaccines in the proper way. At the City Hospital vaccine treatment of chronic ear conditions has been tried with very poor results. Dr. Hays believes that this is due to improper technic, as the culture was made from the pus as it exuded from the canal. Dr. Hays said that he would avail himself of what Dr. Haskin had said, and see if he could not get better results.

The three papers that were read this evening were most encouraging, and offer a great deal of hope to every one who comes in contact with such a distressing condition as chronic suppurative otitis.

Dr. Voislawsky said that it is not only the house surgeons who are at fault, but that many of the older men, unfortunately, also use faulty technic.

Dr. Robinson said that all are familiar with the excellent results obtained, sometimes, in chronic suppurative otitis by careful local treatment, where personal attention is given daily. In the cases reported by Dr. Haskin, the results would have been more accurate if the local treatment had been given separately and not in combination with the vaccine.

Dr. Lederman said he believed that a number of these cases will improve materially under autogenous vaccines. He has followed the suggestion of Dr. Harvey Cushing in the use of urotropin, and would like to know from Dr. Haskin whether that was given as a test before the vaccine was applied. In a number of cases which he has had under observation this winter—very frank cases of mastoid involvement—he obtained very satisfactory results by simple drainage and ten grain doses of urotropin, together with the application of argyrol to the nose and nasopharynx. These were very distinct cases of mastoid involvement, with temperature, excessive discharge and tenderness over the antrum and tip. He feels that the urotropin was of considerable value in the treatment of acute aural suppuration and nasal infections.

Dr. Wilson asked why not treat them with a simple incision and drainage, without the use of urotropin.

Dr. Lederman replied that ordinarily they would have been operated upon, on account of the persistence of the symptoms, but that the above treatment was instituted with satisfactory results.

Dr. Bowles said that he did not know whether what he had to say would be of any value, but that he, like others, was interested in remedies that would cure, without operation, if they could be found. He made no claim to know anything about vaccines, but he had tried successfully other ways of getting rid of chronic otorrhea, and had recently been telling the chairman of some of them. One of these patients was a woman of sixty-five years, the daughter and widow of a physician, who had had recurrent attacks of ear trouble since childhood. She got well and has remained so for over two years, with her hearing materially improved. Another case was that of a child, following scarlet fever. An operation for mastoid was performed, but the discharge continued. Under careful treatment this child got perfectly well, and has remained so. In another case which he has been treating after a mastoid operation, in which the discharge continued, one ear is now practically well, with satisfactory hearing, and the other ear is better. Many more such cases could be enumerated, which have been treated without the aid of vaccine and without resorting to mastoid operation.

However, that does not prove anything—just a few cases of that kind. It all depends on what was the cause of the discharge. One case may have healed without treatment, another may have required operation. If anything will do away with operation, it ought to be welcomed.

The doctor said that he was very glad to have heard the papers on vaccine treatment.

Dr. Dixon said that he was astonished to hear of the good results obtained in cases of streptococcus capsulatus infection. That was a "scare bug" to him, and had been for a good many years; but lately he has begun to wonder what would happen to a good many of these cases if they were let alone. He is not so sure, now, that if a capsulatus case gets over its acute form, and the discharge appears to be stopping or even becoming somewhat less, and there are still no definite symptoms of any sort, whether it might not get well without operation. However, in every case that he has seen operated upon, in which a capsulatus infection had existed for three weeks or more, the mastoid process has been absolutely rotten. There was no other word to use. He would hesitate to use a vaccine on cases of streptococcus mucosus.

There is no question that many are too lax in preparing vaccines. Not sufficient care has been exercised, and there have been too many "shot-gun" vaccines made—taking everything that comes along. In many instances the ear was not cleansed at all—simply a swab run into the canal, and the vaccine prepared and shot into the patient. He would not like to have any such preparation injected into him.

From what little vaccine experience he has had with chronic cases, they are liable to recur. That does not seem to have been the experience of the gentlemen who had read the papers tonight, and he was very glad to know it. Perhaps something had been overlooked.

The patient to whom Dr. Hays had referred, and whom he and Dr. Hays had treated together, had not been without a furuncle, on some part of his body, for as long as two weeks in as many years. This man was treated with an autogenous vaccine, and so far as Dr. Dixon knows he has not had a furuncle since. He attributed the result in this case to the vaccine. The treatment was kept up thoroughly for about two months. He had never seen a case with such severe furuncles as this patient exhibited.

Dr. Dixon said that he was very glad to have heard the papers, and congratulated Doctors Brown, Haskin, and Dwyer upon having called the matter to the attention of the section.

Dr. Haskin said that several points were brought up in the discussion which he would like to answer.

Dr. Dixon had spoken of cases with infection of capsulatus mucosus as being particularly dangerous. A number of cases of this infection were included in the list reported. The organism which was isolated in these cases was the capsulatus; what the original organism was he could not say, as the discharge had been present for years.

Replying to Doctors Blackwell and Robinson: All of these cases were first treated by other measures, for not less than ten days, some for three months, eleven months, two years, and three years, respectively. and all failed to get well until the vaccine was given. They received the same treatment that has always been given, and yet they did not heal until they were given the autogenous vaccines, after which they dried up promptly.

As Dr. Nagle's first report was made in 1910, and the second in 1912, some of her cases have now been under observation for over four years, and they have not recurred. He had stated, distinctly, that they did not claim that these cases were permanently cured. They have been doing this work on these chronic cases for only a few months, and no claims of permanent cure are yet justifiable. But the conditions had existed for months or years, and had failed to respond to every form of treatment that had been tried; whereas, under their observation. most of the case improved, as soon as they received the vaccine, and seemed to be cured at the end of the treatment.

As to what Dr. Blackwell had said about not considering the radical mastoid operation a dangerous one, he was afraid that he had not read much of the literature on the subject, or studied the tabulated reports of deaths and complications following the mastoid operation.

In regard to the chronic throat conditions of which Dr. Hays had spoken, they have had, at the Manhattan, a number of cases of ethmoiditis which were treated at the same time with vaccine for chronic suppurative ear conditions. In one girl the pyocyaneus was found in the ear; and she was under treatment in the throat department for ethmoiditis, in which the staphylococcus aureus was isolated. Dr. Dwyer got the vaccine that was prepared for the throat clinic, and combined the two vaccines. Both ear and nose rapidly became dry. She has been kept under observation, reporting every two weeks, and it was hard to recognize her as the same girl.

A remarkable feature of the treatment is the effect on the general condition of children. Instead of being anemic, emaciated children, they become bright and happy, have good appetites, and are completely changed for the better.

Dr. Haskin said that he attributed much of his success, without the treatment of vaccine, to the use of the vacuum cleaner. It is the only method by which one can actually clean out every ear. He would be willing to take any case, after it had been wiped as dry as possible, and show that he could still suck out some secretion. When the ear is once thoroughly cleansed and the proper medicament applied, it is very likely to remain dry. In one instance the patient had been treated for four months by another physician in the clinic, but did not get any better. One thorough cleansing (for taking of cultures which proved to be the pseudobacillus) caused the ear to dry, and it has remained so ever since.

When this method was first tried, they used to clean the ear out with the suction, and then have the patient lie down so that the alcohol would get thoroughly into the ear. But that caused complete sterilization of the interior of the tympanum and killed all bacteria. The smears showed the presence of bacteria, but the cultures showed no growth, as the bacteria had been killed. For that reason, he stopped filling the canal with alcohol, but used a cotton pledget, saturated with the alcohol. Since this plan has been adopted, there has been no failure to get a culture.

Some cases, when thoroughly treated, dry up without further effort; but, as Dr. Myles had said, it was difficult to do this with clinic patients. In private cases, if you take the time and keep them thoroughly dry, you can often succeed. If you give irrigations, however, and tell them to use them at home, you will likely fail. It is impossible for any patient to actually wipe the canal dry, which procedure must be carried out, if we are to successfully treat them.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of April 10, 1914.

DR. A. P. VOISLAWSKY, PRESIDENT.

Acute Mastoiditis Following Chronic Suppurative Otitis—Radical Operation Followed by Pneumonia and Temporosphenoidal Abscess—Operation—Recovery.

DR. LINN EMERSON: There is not much to be seen in this case, except that the little girl is now in fairly good health. She has never been a robust child. She weighed three pounds at birth, and had a cleft palate. She is now six years old. About a year and a half ago she was brought to me for a cleft palate operation, and upon examination it was discovered that she had a chronic suppurative otitis of long standing. It was thought best to attempt to cure this condition without operative procedure before undertaking the cleft palate operation. She was accordingly brought to the office every day for careful personal treatment. During this period of treatment she suddenly set up an acute mastoiditis. This condition was not appreciated by the mother, and the child was not brought to the office for several days. Finally, after five days, she brought the child to see me. The little girl was then very ill, had a temperature of 105°, and there was tenderness over the mastoid. She was taken to the hospital for immediate operation. An extensive radical operation was performed on January 4, 1914, and the antrum was found to be full of cholesteatomatous material; the sinus and dura were exposed. The day after the operation the child still had high temperature—between 106 and 107 degrees—and had developed a double pneumonia. The condition was acute, and her life was despaired of, so very little attention was paid to the mastoid wound for the next two weeks, as death was expected every moment. The wound had broken down, the general condition was very unsatisfactory, and all that could be done was to remove the dressings and apply fresh ones. Finally, at the end of two weeks, the temperature came down, the child apparently began to improve, and hopes of her ultimate recovery were entertained. She was very obstreperous during the dressing of the wound, and it was observed that, as she cried and struggled during the dressing, pus would well out of the wound near the sinus. The interne called my attention to this, and four weeks after the first operation I examined her again, and found that I could pass a probe nearly two inches in the direction of the temporosphenoidal lobe, and that she had a temporosphenoidal abscess which was discharging through the wound. A second operation was done through the old mastoid wound, and upon cutting away the bone, an abscess cavity the size of an English walnut was found. The cavity was packed and drained, and the child made a good recovery, leaving the hospital in June. The middle ear cavity is perfectly dry.

I feel perfectly certain that if her lung symptoms had not overshadowed her brain symptoms, and had her true condition been recognized and the brain operated upon at that time, she would have died. But, fortunately, the abscess cavity drained into the wound, and when she got over the pneumonia the abscess was treated, and she was saved.

DISCUSSION.

Dr. Friesner asked if cultures were made from the mastoid wound at the time of operation.

Dr. Emerson replied that he thought so, but was not sure.

Dr. Friesner said that the acute mastoiditis might be a local manifestation of the general pneumococcus infection which so frequently occurs, particularly in children. He had wondered, then, what would be the character of the infection in the presence of pneumonia.

Dr. Tymeson replied that a culture was made from the ear and developed streptococcus.

Paper: Double Radical Mastoidectomy in Dementia Precox With Phenomenal Improvement in Mental and Physical Condition.*

By George E. Davis, M. D.

DISCUSSION.

Dr. McCullagh inquired further about the second case reported by Dr. Davis. As he understood it, the patient was admitted to the hospital suffering with mental trouble, and a month later he developed an acute mastoiditis.

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*See page 597.

Dr. Davis replied that the patient probably had had a chronic ear trouble. He himself had not examined the man until a month later.

Dr. McCullagh said that he understood Dr. Davis to say that the perforation had healed after the discharge appeared the first time.

Dr. Davis replied that when the opening in the drum closed the temperature rose. This was followed by a second spontaneous rupture with relief of symptoms, but this did not continue. Then the man had an acute mastoiditis with all the exaggerated symptoms, and after the operation he cleared up completely.

Dr. McCullagh asked what was the type of the mastoid process and if the bone was ebonized.

Dr. Davis replied that after getting through the cortex, which was sclerosed, disintegrated bone tissue was found, and the hardened cortex indicated a previous chronic condition.

Paper: Some Labyrinthine Studies.*

By James A. Babbitt, M. D.

(by invitation.)

DISCUSSION.

Dr. Vail said that it had been a great pleasure to him to come over from Philadelphia to attend this meeting, as it is always an advantage for men to attend meetings in other towns than their own, and to learn how work is carried on elsewhere. He was not, however, prepared to discuss the scientific aspects of the paper, which certainly opened up a number of interesting suggestions, and he had enjoyed listening to it very much. As far as the three modes of locomotion—by air, water, and land—are concerned, most of us get along pretty well by automobile, and the aviation features will not trouble very many for some years to come. If, however, some one could discover a method of preventing the movement of the otoliths produced by the pitching and tossing of vessels on the ocean, it would be a great benefit to those of us who are not good sailors.

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*See page 607.

Dr. Gruening: The title of the paper, "Labyrinthine Studies," acts as a lure. We are all desirous of learning more of that intricate subject—the physiology of the labyrinth. He had been much interested in Dr. Babbitt's paper, as it had presented a very good resumé of what is known, but he felt that the writer was a little too sanguine in regard to some points that are less well established. The statement that from the position of the semicircular canal and the inclination of the head we could predict the direction of the nystagmic movements, is not borne out by experience. Furthermore, that the functions of the maculæ in the utriculus and the sacculus were known, was new to him. As far as his reading went, nothing is known of the physiologic function of either the utriculus or the sacculus and their maculæ.

The subject of the vestibular labyrinth is exceedingly interesting, both from the ophthalmologic and the otologic standpoint. Necessarily, every labyrinth must be connected with every ocular muscle on both sides, and each labyrinth must be connected with all the ocular muscles. Only in this way can we explain all the nystagmic movements which occur.

Ordinary locomotion has become automatic. We are not aware that we use our muscles. It is only when we balance ourselves (e. g., the tight rope), that we become conscious that we are equilibrating. Therefore, there must be a connection between the cortical center and the labyrinth. The subcortical centers are used to do the automatic work, but when we become conscious of the fact that we must equilibrate, we balance, and that is done with the cortex, consciously. To consider vertigo merely in its connection with the ear or the eye is not sufficient. There is vertigo due to cortical irritation.

Putting everything together, it would seem that the nystagmic movements are not so simple as they have been described to be by either Bárány or others. Bartels has done some very good work along these lines, and his articles, published in *Graefe's Archives,* in 1910 and 1911, are well worth study.

Dr. Eagleton said that one phase of the question which has interested him very much was not touched upon by the writer of the paper, and from the clinical side it is very important. As he understood it, Dr. Babbitt had been trying to arrange a correlation between an induced nystagmus—the ability to balance, and certain coordinated acts, and also the relation to vertigo. What the physiologic action is we do not know; but one factor was not spoken of which is very important—i. e., disturbancesof intracranial pressure.

Dr. Eagleton said that during the past few years he has been much interested in watching the effects of induced nystagmus in cases of tumor of the brain. Two years ago he directed attention to the fact that in tumors of the brain there is a quickly induced nystagmus—the vestibular apparatus is hyperesthetic. This observation has been confirmed by observation on numerous cases. Within the past week he had seen a patient who was thought to have a tumor of the brain. Nystagmus was induced, and when a few drops of water entered the ear the patient had a strong nystagmus. Later on, as the increased intracranial pressure adapts itself, there is an anesthesia of the vestibular apparatus; and if you try to induce nystagmus in such patients by the cold and heat tests, you will find it almost if not entirely impossible. He has had three cases in which the caloric tests were applied many times, and the galvanic tests also, and it was impossible to produce a nystagmus. In the case of patients who have tumor of the brain and suffer naturally from vertigo, it is often impossible to make them dizzy by stimulation of the vestibular apparatus.

Another thing is the fact that we have, in the lack of ability to induce nystagmus, a symptom of increased intracranial pressure. Dr. Eagleton expressed the hope that Dr. Babbitt would consider the question of intracranial pressure in his future studies along this line.

Dr. Davis said that he had been especially interested in the reference to the origin of muscle tonus. Dr. Babbitt had cited Ewald's law, that a tonus from the labyrinth goes out to the musculature of the whole body. Some two or three years since, Bárány, at Basel and at the Psychological Congress in Innsbruck, gave as his opinion that the vestibular apparatus plays only a subordinate function in the maintenance of equilibration and muscle tonus, and that it was the major function of the cerebellum to tone up and increase the musculature, by means of the socalled proprioceptive reflexes. Therefore, while the vestibular apparatus, as well as the kinesthetic or muscle and joint reflexes, contribute to this tonus, they are not essential; and this seems all the more plausible when we remember with what facility, and in a relatively short period, equilibration is reestablished after the ablation of both labyrinths, which goes far in substantiating Bárány's claim along this line. Bárány further contends that another contributing function of the vestibular apparatus is the toning up of the various centers of the cerebellum which takes place in the resting condition.

Dr. Friesner said that he had been much interested in Dr. Eagleton's remarks concerning the influence of increased intracranial pressure on the reflexes from the vestibular apparatus. In the last case that Dr. Eagleton described, in addition to the loss of reaction to the caloric stimulation, there was also a loss of reaction to the galvanic current. This condition indicated that the conductivity of the nerve had been abolished—i. e., that the conductivity of the nerve had been destroyed by the tumor.

The term, brain tumor, seems to have too wide a scope—tumors in the posterior fossa would possibly be more apt. Dr. Friesner suggested that the disturbances in the labyrinthine reflexes were not due to intralabyrinthine changes, brought about by pressure, but to direct or indirect involvement of the eighth nerve or of the centers in the cerebellum which influence the nystagmus reflex. It is known, for instance, that there are centers in the cerebellum which exercise inhibitory influences on the nystagmus.

Dr. Babbitt's paper was exceedingly interesting and opened new fields of thought.

Dr. Friesner agreed with Dr. Gruening's statement that very little is known about the maculæ. Lee, Kubo, and others have shown that certain eye movements are the result of stimulation of the end organs in the vestibular apparatus. Seasickness, according to Bárány, is due, in part, to irritation of the maculæ in the vestibule. It is unaccompanied by nystagmus. If it were due to irritation in the end organs in the cristæ, it would be accompanied by nystagmus. Bárány states that so long as his head was in the horizontal plane he was not seasick, but the moment he raised his head, even though his body was supine, he was sick, and vomited. This must be due, he argues, solely to organs contained within the head, and he concludes that the only organs that come into consideration are the maculæ.

The psychic influences on the vestibular reflexes are very interesting. It does not seem certain, however, that music can be classed in this group, for the reason that the theory was advanced, long ago, that the involuntary movements that accompany the hearing of dance music are the result of the impression upon the acoustic labyrinth, transmitted to the static labyrinth—that is to say, that they are tonic movements of the muscles engendered through the indirect irritation of the non-acoustic labyrinth.

Dr. Meding felt that in the discussion one should not forget the author's careful statement, "that the figures and charts presented were too cursory and limited for basic thought." Dr. Babbitt has tried to stimulate us to a further and useful study of the labyrinth and its effects on equilibration. Certainly the subject appeals. Former remarks on the subject of intracranial pressure and dizziness did not, however, seem to tally with experience. We have dizziness with low pressure, and high tension without dizziness. We have dizziness in the young and in the old. Seasickness has been referred to every organ of the anatomy, and, strangely enough, has been relieved, in some instances, by the various remedies suggested by the proposed cause—so a belt has served some, and bromid others. As to the position of the body, no difference has been experienced by those known to Dr. Meding. In some measure, at least, these various movement sicknesses seem to be neuroses; and if the labyrinth be connected with every impulse receiving part of the body, we are yet at a loss.

Dr. Duel said that the remarks of Dr. Meding in regard to intracranial tension called to mind a case which might be relevant. Three years ago a stock broker, who had been under treatment for otosclerosis, had developed such extreme and frequent attacks of vertigo that he had been incapacitated for work. Dr. Duel had directed his attention to the reports of Drs. Putnam and Blake, in which they had attempted to relieve dizziness by removing a small quantity of spinal fluid by lumbar puncture. The patient was impressed, and at his request twenty to thirty cubic centimeters of fluid had been removed. The relief had been so pronounced that since then he had had only two serious attacks of dizziness until quite recently, when he had again begun to suffer from frequent distressing seizures. Only yesterday, at the patient's urgent request, Dr. Duel had removed twenty cubic centimeters by lumbar puncture, hoping that he would again be relieved.

Dr. Duel said he had never been able to explain satisfactorily how vertigo was relieved by spinal puncture, unless it be by some reduction of intracranial tension. We do not know much about it. Fortunately, we have learned enough about the simpler functions of the labyrinth, so that we can generally diagnose pathologic conditions and know fairly well when and when not to operate, but, so far as the higher problems are concerned, we have still a long way to go.

Dr. Gruening said: The statement of the previous speaker, "that we now know exactly when to attack the labyrinth by an operation," is certainly not borne out by the literature of the subject. We do not yet know with certainty in which cases the labyrinth should be operated upon. Much light has recently been thrown on this subject, and we may hope for safer guides in future.

Dr. Babbitt, in closing the discussion, said that he had not considered the question of tumors in the preparation of the paper. He trusted that the members of the section would remember that he had stated, at the outset, that the material which was presented had been offered instead of another study which had been planned, and that the results were merely suggestive. It would not be fair to make any sweeping deductions, such as one might be tempted to draw, from the eighty cases which had been studied. He simply presented his deductions from these eighty cases, studied under the conditions described, as the personal estimate of one individual. It would be a totally false basis to work upon, unless a sufficient number of cases were studied to give an average which would be absolutely convincing.

The vestibular test was not judged entirely as to the length of time, and the length of time should not be recorded as the index: it simply represented those which prolonged the maximum vestibular reflex and in marked degree. The study presented was neither pathologic nor surgical, but was simply a basic functional study.

NEW YORK OTOLOGICAL SOCIETY.

Stated Meeting, March 24, 1914.

DR. FRED WHITING, PRESIDENT, IN THE CHAIR.

Radiographic Pictures of the Jaw.

DR. WILLIAM H. HASKIN presented a number of radiographic pictures of the jaw, with a unique card container. Among the number of pictures was one very indefinite print, in connection with which it was explained that by using contrast papers in printing it is possible to bring out more than is shown on the film or X-ray negative. By rephotographing and reprinting with this special paper, a great deal more can be made out of weak pictures.

Instrument for Use in Exploring a Brain for Abscess.

DR. J. R. PAGE presented a small instrument for use in exploring a brain for abscess, which had been suggested to him by Dr. Farrington of Memphis. It was constructed, after the fashion of Lucae's bayonet forceps, with thin blades, on which the distance was graduated in centimeters. It could be introduced into the brain with the blades closed, and by means of a set screw the blades could be allowed to spring open to a regulated degree for the evacuation of the abscess and the introduction of drainage. He also called attention to a celloidin tissue, to be used for drainage, which can be placed under the dura of a dog and left there for months, without causing irritation. The material also comes in tubes. The tissue can be boiled as long as desired. Dr. Frederick Prime, who had been experimenting with it in the laboratory of the College of Physicians and Surgeons, published an article about it in the November number of *Surgery, Gynecology and Obstetrics.*

DISCUSSION.

DR. PAGE, closing the discussion, said, in reply to a question by Dr. Whiting concerning the friability of the celloidin tissue, that it seemed to vary, some specimens being very fragile, others tough. Dr. Prime had declared it to be absolutely nonirritating. Answering a question by Dr. Lutz, regarding the feasibility of using the tissue in septal tears, he said he knew of no one who had employed it in such cases. His own experience with the material was limited.

Otitis Media Purulenta Chronica With Hallucinations.

Dr. J. A. Kenefick gave a history of a woman who had been coming to his clinic for perhaps four or five months, complaining of what was diagnosed as otitis media purulenta chronica. This condition had been controlled by treatment. On two or three occasions polypi had been removed and final healing took place. X-ray pictures had been made of the mastoids. On the affected side the cells were somewhat cloudy; on the other side they were clear. There was no mastoid tenderness; nothing to justify a diagnosis of anything more than simple otitis media. During the course of this trouble the woman, who is about thirty-four years of age and married, began to have hallucinations. She had often come to the clinic saying what "they" would do to her. There was no history of insanity in the family. She had various obsessions, chiefly of a sexual character. He had never had a patient describe such apparently real occurrences. According to the history she had never manifested this mental condition before the ear began to discharge. It was possible that the brain was involved, as it has been found to be in so many institutional cases. He referred to Dr. Bryant's observations on cases of chronic catarrhal otitis media at the State Hospital for Insane, in which there were hallucinations.

DISCUSSION.

Dr. S. H. Lutz said he thought the ear condition was not necessarily the cause of the insanity. A few years ago he had seen a number of cases at the Long Island Hospital in which there was middle ear suppuration of long duration, yet when some of them came to autopsy, no connection between the ear and the brain was shown. The two conditions in Dr. Kenefick's case might be merely coincidental. He asked if any cases had been reported in which a connection between the middle ear suppuration and the mental condition had been demonstrated.

Dr. Thomas J. Harris called attention to three cases, recently reported in the *New York Medical Journal* by a doctor of Philadelphia, the patients consulting him on account of the symptom of "hearing voices." The patients were all women, and all were over fifty-five years of age. The specialist in mental diseases who reported the cases thought there must be some disturbance in the cochlea. The diagnosis of the otologist was chronic middle ear catarrh. The women were otherwise perfectly well. These were not institutional cases; the patients were mothers of families, and were attending to their household duties.

Dr. Kenefick, closing the discussion, said no Wassermann test was made. The woman was the mother of three children, and aside from the conditions mentioned seemed to be perfectly healthy. Inasmuch as there had been no mental symptoms present before the ear was manipulated, the question presented itself as to what might be started up by that manipulation. He did not know that the polypi had been removed, as it was against the rules of the hospital to remove polypi in the clinic. Dr. Dixon assured him that the roentgenograph disclosed nothing suggesting cerebral growth or abscess.

Brain Abscess.

Dr. E. B. Dench, discussing a case of brain abscess reported by Dr. Eagleton, said that he was in the habit of exploring the abscess by means of a director which was graduated in quarter inches in a manner similar to the needle presented by Dr. Page. After the director had entered the abscess cavity he was then in the habit of introducing a rectangular retractor made of pure silver. The retractor was constructed of such thin material that it would bend rather than bruise the brain tissue. The retractor being introduced along the director until it entered the abscess cavity, the director was then withdrawn, and a second retractor, a counterpart of the first, was passed along the retractor already in the abscess cavity. The second retractor entered the cavity of the abscess. By separating the retractors gently a complete view of the abscess cavity could easily be obtained without any injury to normal brain tissue. The cavity of the abscess could we wiped out and subsequently packed. Dr. Dench believed that these retractors served a better purpose than the encephaloscope.

Otitis Media Purulenta With Dehiscence of the Tympanic Roof.

Dr. Robert Lewis reported a case of otitis media purulenta with dehiscence of the tympanic roof, meningitis, and death.

Notwithstanding the fact that a radiograph showed the mastoid cells to be normal, he determined to operate, as the clinical picture was complete.

There was a streptococcic infection, considerable discharge, tenderness on pressure over the mastoid process, and a marked sagging of the posterior and superior portions of the external auditory canal wall. Upon operation the mastoid was found to be absolutely normal. About thirty hours later the patient, a woman, developed a high temperature, 105° + F. A few hours later a lumbar puncture showed pus to be present in the spinal fluid. Within forty-eight hours she died.

The autopsy showed a dehiscence in the tympanic roof, with the dura adherent around the edges of the opening, and eroded within the center of this adherent area, from which point the purulent inflammation extended above over the vertex forward and downward.

At the operation a small portion of the dura had been exposed over and back of the mastoid antrum, but was free from evidences of infection, and at the postmortem showed no signs of infection at this point.

If an autopsy had not been performed he would have been at a loss to explain the cause of the purulent meningitis from which the patient died, and would have considered himself culpable because he had not operated.

He regretted the inability to obtain more autopsies, which often reveal an error in diagnosis, but which in this case showed that there was no cause for self-criticism.

DISCUSSION.

Dr. Kenefick recalled a previous discussion by this society of the subject of dehiscences in the tegmen tympani, and shortly afterward he asked Dr. Dixon what the X-ray photograph could be expected to disclose in these cases. The latter thought it would show nothing unless there was a marked shadow. He asked if any such evidence was observed in Dr. Lewis' case.

Dr. Lewis, in closing the discussion, said after the operation he could discover a little shadow on the X-ray plate, but he could not have read it from the plate itself. Having seen the result of the autopsy, he could make out a little spot which he thought was the dehiscence.

Streptococcus Mucosus Capsulatus Infection.

Dr. William H. Haskin, discussing a case of streptococcus mucosus capsulatus infection reported by Dr. Duel as having been successfully treated with autogenous vaccines, mentioned three cases, in two of which the patients recovered, while the third died. One patient was being treated by Dr. Dwyer at the same time Dr. Duel was treating his case.

DISCUSSION.

Dr. Gruening did not consider these cases convincing with regard to the autogenous vaccine. When a thrombus has been removed and the jugular ligated the temperature often remains high for a few days, then subsides, and most of the cases, providing the operation has been thorough, recover. This applies to cases with oscillating temperatures, as well as to those without. He did not think the use of the vaccines had changed the character of the disease. The important thing was to find the thrombus and remove it, tying the jugular. One of Dr. McKernon's cases in which no operation was performed is entitled to special consideration.

Dr. James F. McKernon said when the thrombus is removed and the jugular ligated and resected the operator has gone as far as possible, so far as the macroscopic infection is concerned; but in some cases all infection was evidently not reached, for the reason that the temperature does not subside. In such cases the use of the autogenous vaccines simply aids convalescence. In Dr. Duel's case he had gone as far as he could, but the patient did not get well, and looked as if he could not live twenty-four hours. For that reason the autogenous vaccine was suggested. The speaker had had other cases since the first report, and he was by no means convinced that it was not a good practice, after removal of all macroscopic thrombotic material, to give large and frequent doses of the vaccine for the purpose of hastening convalescence. He had seen no results from the use of the vaccines that were detrimental to the patient, except soreness at the point of injection.

Dr. E. B. Dench thought that the point about ligating the jugular below all macroscopic evidence of infection not well taken. A thrombus in a vessel frequently hangs down for a considerable distance in the lumen of the vessel. He recalled one case in which the clot was suspended like a stalactite in the vessel, and projected downward for fully three-quarters of an inch. He thought it wiser to excise the jugular from a point low down in the neck to a point above the origin of the facial vein. We know that some cases of sinus thrombosis get well, although the clot in the sinus is not disturbed, as evidenced by cases found long years after sinus thrombosis has occurred, in which the sinus is completly obliterated by the organization of the clot, without any interference whatever with the jugular. When the vein is interfered with, it is Dr. Dench's opinion that it should be resected from a point low down in the neck to a point above the origin of the facial vein. In some cases the clot may not be infected, but infection of the vessel wall is frequently present in these cases, and this may lead to a bacteremia. In one case which had recently come under his observation the clot extended down to the torcular and down to the bulb. The mastoid operation was a long one, the radical operation being necessary in this case, and the patient lost considerable blood incident upon clearing the clot out from the sinus. In this instance the jugular was not interfered with until the third day after the primary operation, but on the third day an abrupt rise in the temperature and the general condition of the patient made jugular excision imperative. This patient made an uninterrupted recovery, although on the second day after the removal of the vein the temperature rose to 106°. The patient then made an uninterrupted recovery, although two weeks after the vein was taken out there was a sudden, unexplained rise in temperature to over 104°. Had vaccines been used in this case, they would certainly have been credit-ed with having effected a cure. He thought, therefore, that one should be very careful in attributing a cure to vaccines, owing to the irregular temperature which these cases frequently run, irrespective of vaccine therapy. He believed that vaccines might be valuable in giving the patient increased resistance. At present, however, he was not prepared to endorse vaccine therapy in all these cases.

Dr. Wendell C. Phillips said this was a subject worthy of careful statistical consideration. Final results seemed to be about the same, whether the vessel is ligated or dissected. The method of ligating had one distinct advantage. The patient was usually very much exhausted from the preceding operation, and the simplicity of ligation, requiring only from five to ten minutes, was decidedly in its favor.

Dr. T. Passmore Berens called attention to two different classes of these cases. In one there is a decided septic thrombus. At the point of the thrombus, and perhaps a little on each side of it, the vein is discolored, the rest of the vein appearing normal. This is the usual form. In some cases, however, there may or may not be a demonstrable thrombus —the vein contains white striations extending far above and below the seat of the infection. With one or two exceptions, in his experience, all of this class of cases had been fatal. In one case in which autopsy had been obtained, the whitish striations extended from the point of infection all the way down the vein to the innominate, and along the walls of this into the vena cava. Sometimes the whole vein is white or whitish. In all of these cases the vessel should be ligated and exsected as far down as may be possible—and the sooner this is done the better, in order to avoid the spreading of the phlebitis.

Dr. Gruening thought the more thorough the operation the less the need for vaccines. He always tied at the clavicle and removed the entire vein, and he had seldom had a recurrence of the temperature.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, held March 17, 1914.

PRESIDENT, DR. OTTO J. STEIN, IN THE CHAIR.

Report of a Case of Necrosis of the Superior Maxilla With a Sequestrum Containing Three Incisor Teeth Which Look Externally at Least to be Normal.

DR. L. W. DEAN, of Iowa City, Iowa, reported this case. The sequestrum was produced in a very unusual manner. The patient, a female, about seventeen years of age, gave a history of having had her teeth regulated. This regulation had been carried on for nine months preceding the time that the patient came into Dr. Dean's care. The specimen shows around the roots of the three teeth near their apices an elastic band, of the kind which orthodontists use in regulating teeth. The band had evidently been forgotten or lost, and had wandered down along the roots of the teeth to near the apices and produced the sequestrum.

Exhibition of Specimen of Brain Showing Nothing Except a Small Temporosphenoidal Abscess.

DR. DEAN reported the case of Mr. B., white, aged thirty years, admitted to the University Hospital on January 13, 1914. The patient had suffered from chronic otorrhea in the right ear for nine years. About a month previous the patient had had an attack of dizziness, which was not accompanied by vomiting or headache, and since then he had had several dizzy spells.

Examination showed the eyes to be negative. Ears: Right, no hearing, tympanic membrane destroyed, canal filled with pus, tympanic cavity contains granulations, caloric negative; left ear, negative. Examination of blood: Leucocytosis, 10,400; polynuclear count, seventy-six per cent. Physiologic nystagmus to the left and right. Station: Patient falls to the right, regardless of the position of the head. Pointing test: With the right hand, to the right; in the absence and in the presence of an induced nystagmus, to the right. Left hand normal; in the presence of an induced nystagmus, points to the left.

Operation on the right mastoid, January 14th—temporomastoid exenteration. Cortex of mastoid eburnated. Large area of necrosis around the antrum. There was a large perforation in the inner table of the middle fossa. Labyrinthectomy was performed, discovering a large fistula in the semicircular canal. The seeker introduced into the fistula readily entered the vestibule. The bone in the solid angle was soft and necrotic, the necrosis extending to the posterior fossa. The bone was removed to the dura, exposing it in the posterior fossa anterior to the sinus and in the middle fossa over the tegmen antri.

Following operation the patient had slight facial paralysis: no nystagmus; pointing test was normal with right and left hands, and the station was normal.

On February 13th, the patient complained of headache and being dizzy. On February 14th, there was much pain in the head, some rigidity of the muscles of the neck, no Kernig, no muscular twitching, reflexes normal. Blood count: Leucocytosis, 23,000; polynuclear of seventy-nine per cent. Lumbar puncture showed slight pressure. Examination of spinal fluid: Fehling's solution not reduced; Noguchi globulin, positive; cell count, 9,000 per cubic millimeter. Subdural drainage was performed. For several days the patient's condition was very much improved. On February 19th the patient became much worse and died of meningitis. On autopsy a small abscess in the temporosphenoidal lobe was reported, about the size of an acorn, which had ruptured into the meningeal space, and general diffused septic leptomeningitis, most marked in the middle fossa on the right side.

The interesting things in this case were: Were these cerebellar symptoms the result of some change in the posterior fossa, or were they secondary to the brain abscess in the temporosphenoidal lobe? Dr. Dean thought that the symptoms were due to a collection of fluid between the dura and the cerebellum that was secondary to the labyrinthine lesion which was removed, or at least had its pressure dissipated, by the bony decompression operation that was performed when the labyrinth was operated.

Dr. Dean then reported a second case of brain abscess, as follows: Mrs. B., white, aged fifty-two years, admitted to University Hospital, February 3, 1914. For the past three or four years the right ear had discharged at times, the last time in the late fall. Patient said that she had had terrible pain in the temporal region, just above the ear, all the time.

Examination: Patient moans and complains constantly of terrific pain in the head. Mental condition very poor. Constantly agitated and suffers from a delusion of unpardonable sin and being in the power of the evil one. Examination of the eyes negative, except for a neuritic atrophy of the right optic nerve, with a vision of six-ninths in that eye. Examination of the ears: Right ear, whisper heard at ten feet, drumhead scarred and thickened; positive caloric. Left ear, examination negative. X-ray of mastoid shows eburnated bone, or mastoiditis on the right side. Examination of blood showed a leucocytosis of 12,000, with a polynuclear count of seventy-six per cent. Urine and spinal fluid negative. Diagnosis: Chronic mastoiditis with extradural abscess or cerebral abscess.

Operation, February 6, 1914, mastoidectomy. Cortex of the bone hard and eburnated, tegmen antri and mastoid cells posterior to the antrum necrotic. The dura was exposed in the middle fossa and found bulging and covered with rough granulations, but not under increased tension. In hunting among the granulations a small opening in the dura directly over the tegmen antri was found. On stretching this opening no cerebrospinal fluid escaped. Some of the brain substance removed from the inner surface of the dura with the curette showed pus cells, necrotic tissue and streptococci. Material removed from the depth of one-half inch in the brain gave the same findings. The diagnosis was made of brain abscess with discharging sinus through the dura. The sinus was very slightly enlarged and a plain piece of gauze inserted three-fourths of an inch into the brain. Following operation the patient's condition was somewhat improved, but she still complained of the pain in her head, and the result was unsatisfactory. The temperature, which had been ranging from 99° to 101.5°, continued the same. Ten days after operation, because of temperature of 100° remaining, and because of the patient's general condition not improving, a second exploration of the brain was made. Following the same pathway, at a depth of two inches, an abscess cavity was opened. From it fully an ounce of pus escaped. A gauze drain was inserted.

Following this procedure the temperature returned immediately to normal, the pain disappeared, but the patient's maniacal condition persisted. A colleague saw the case and made a diagnosis of melancholia, with the cerebral infection being only a contributory factor. It was found impossible to drain the abscess cavity thoroughly with a gauze drain, and on March 20th a rubber tube was inserted. At present the tube is in position, but there is no discharge of pus. Outside of the mental condition, the patient is practically normal.

Dr. Dean then reported the case of Mr. B., white, aged fifty-one years, seen in consultation on March 9, 1914. On May 1, 1913, the patient had had a mastoidectomy, with obliteration of the lateral sinus, for mastoiditis and sinus phlebitis. Early in the fall of 1913 the patient complained of headache and roaring in the head. The pain was in various parts of the head, but always on the right side. Otherwise the general health was good. At times the patient was dizzy. On the morning of March 9th the patient complained of headache, and said that his head had been aching for several days, and that there was pain in the right ear. Patient worked at his usual vocation of driving a motor car throughout the day without apparent trouble. In the evening, while in a barber chair, the patient said: "My, I feel deathly sick," and in a few minutes he was unconscious. He was examined by two physicians, who reported him unconscious. There were no reflexes present, except a very slight contraction of the pupil to light. There was complete general anesthesia, including the corneæ, except over the squamous portion of the right temporal bone, where tapping with the finger produced a spasmodic contraction of the muscles of the face and eyelids. The patient was moved to the hospital, arriving there the evening of March 10th, about ten o'clock. Examination of the general nervous system was negative; examination of the urine, negative; blood pressure, 95 mm. of Hg.; spinal puncture revealed a clear fluid, under apparently normal pressure; temperature 98.8°; pulse 60; respiration 20; examination of the eyes revealed pupils small, reaction to light sluggish, a very fine horizontal nystagmus present, shown only by using the ophthalmoscope, fundi normal; examination of the right ear showed the right drumhead reddened and slightly bulging.

Operation.—A semicircular flap of skin, fascia, muscle and periosteum was elevated from the temporal region, the incision extending from the upper part of the mastoid in a circular direction, upwards, forwards and downwards, to the anterior border of the posterior end of the zygoma. The flap was dissected downwards so as to expose the upper border of the external auditory canal. The dura was tense and reddened. It was painted with tincture of iodin and then incised. Incision of the dura resulted in the escape of a small amount of fluid under pressure. The brain did not bulge into the opening, so we were probably dealing with a localized meningitis. The brain was explored. At a depth of one and one-half inches from the lateral surface, over the tegmen tympani, a softened area was discovered. A gauze drain was inserted, the semicircular flap replaced, and a vertical incision one and one-half inches long made directly over the incision in the dura. Through this incision the drain was passed and moist compresses applied.

The morning following operation the mental condition was good. His brother, who was with him during the night, said that after the effects of the ether were gone he was apparently mentally all right. In the morning he recognized the speaker immediately, although he had not seen him for six months before, and then only a few times. His temperature was normal; pulse 70 to 80. On the fourth day the drain was removed, and the patient has been apparently well since. At the time the drain was removed a condition new to us was observed. Following the withdrawal of the gauze drain eight or ten very large bubbles of gas escaped. They came from the bottom of the cavity and carried with them pus and pieces of the brain débris. Unfortunately, they were not able to get a culture of the gas forming microorganism which was probably the specific cause of the trouble. There has been no opportunity for the admission of extraneous microorganisms. In this case Dr. Dean thought that the sudden attack of unconsciousness was due to the formation of gas in the cerebral cortex.

DISCUSSION.

Dr. Joseph C. Beck had talked with Dr. Dean about these cases before the meeing, so felt that he could say something about them, having had a chance to think them over and look up the question. From the remarks the doctor made, in presenting this wealth of material, it was almost impossible to discuss the cases and say anything definitely about them, especially the first one. He thought that all the symptoms the patient had could be very easily explained on the labyrinthine irritation rather than any brain irritation. Patients with labyrinthine irritation will have a falling to that side, and the pointing test usually made in that condition is not very dependable. At least, he has not found it at all reliable. At any rate, the small temporosphenoidal abscess there could scarcely come from contiguous pressure on the cerebellum —there could not be sufficient pressure there to produce these symptoms. While the doctor said the case had necrosis of the labyrinth, yet it might have been a localized labyrinth necrosis. There might have been some remains of the vestibular apparatus present. He had examined a case the day previously in which irrigation with hot and cold water gave absolutely no reaction, in a case of supposed labyrinthine destruction, yet when he turned the patient he got a very lively reaction.

The case of gas formation in the brain interested him because he had had recently a case of abscess, with pure culture of a motile bacillus, which was bacteriologically proven to be a bacillus pseudodysentericus, class 2, according to the reactions used for the identification of this class of organisms. The case looked as though it might have been typhoid, or a bacillus coli communis infection, but it proved to be the bacillus pseudodysentericus, and that case had gas formation in the region of the abscess. The group of colon bacilli have that tendency.

Regarding the case of necrosis of the teeth, he thought there was insufficient cooperation between dentists and doctors in this line of work. He had shown a case to Dr. Dean which he would like to refer to briefly, which was quite similar. A patient came to him having an ulcer of the septum, and he could not account for the trouble in the nose—that is, from any nasal affection. This patient complained of pains all along the face. So he sent the patient back to her dentist, and said that he could find nothing to account for her pain. The dentist told the patient to "get a good nose doctor." The speaker had her teeth examined by another dentist, and he discovered a crowned tooth which he thought was at fault. He simply took off that tooth-cap, and there was a dead, black tooth, and underneath it was a sequestrum, one-quarter inch in diameter, and beyond that an area of necrosis. And that was the point he wished to make, with reference to the difficulties that he was meeting constantly, in that the dentists did not cooperate sufficiently in the differential diagnosis and treatment about affections of the nose, throat, mouth and ears, and the teeth.

A Protest Against the Noncensorship of Advertisements of Surgical Instruments, Etc.

Dr. Arthur M. Corwin pointed out that through the efforts of the Council on Pharmacy and Materia Medica of our national association, the medical profession, and therefore the public, has come to find something like security against fake drug combinations and secret formulæ that not so long ago found advertising space even in our best journals. By way of contrast, one may see the glaring misrepresentations contained in various advertisements of surgical instruments that still appear in such journals. Numerous examples were cited. It is high time that the pirate and impostor, the dealer in false pretense, should be shown up and driven out of business or compelled to reform. A proper committee or council should be established to scrutinize the goods and the pretensions of this class of advertisers, in order to protect the buying profession from instruments purported to be patterned after certain approved models, but which are often travesties upon the real thing. These grotesque imitations fail utterly in making good, and therefore disgust the purchaser and bring discredit upon the surgeon whose name the original instrument bears, and upon the operation or technic which he has recommended in good faith. There is no more reason for misleading the profession through false advertising of things surgical than of drugs.

DISCUSSION.

Dr. R. H. Brown asked if he was right in saying that recently an ordinance had been passed declaring against this fraudulent advertising, so that it is perfectly possible for a man to sue in a case of this kind, bring the evidence up in court and obtain judgment?

Dr. Corwin answered that there might be a local ordinance to that effect.

Dr. Brown said that if that were true in Chicago, then it would be a very easy matter to bring up such an impostor, get judgment, and have that judgment published, without any serious reason for a come-back on the part of the manufacturer. It would be one of the best ways, perhaps, of bringing such frauds before the public.

Dr. E. Pynchon thought there was nothing new about the idea of instruments being made entirely different from the design of the one who first got the instrument up. He had had similar trouble with his nasal speculum. The first ones were gotten up by Truax, Greene and Company, and were charged for at the rate of $3.50. Different manufacturers reduced the price until eventually a firm in Philadelphia makes them drop forge, and sells them for fifty cents, and these are no good. He very often sees instruments bearing his own name that he could not use himself. They are not only advertised in catalogues, but he sees the advertisements for them in medical journals, and he also sees such instruments in physicians' supplies stores. It is wrong for surgical instrument dealers to reproduce different patterns of instruments so as not to conform with the design originally called for by the inventor.

Dr. J. Holinger said that usually things that are cheap in price are cheap in quality. He did not think it was the society's business to protect those who do not want to pay the money for good instruments. They deserve to be fooled. There is nothing new in that. But he wanted to ask Dr. Corwin where he would draw the line between cheap instruments from an acknowledged cheap firm, and worthless ones from a good firm? For example, there are chisels being sold every day by a well-known, first-class house which do not deserve the name of chisels, and these instruments are sold at fair prices. He had experience with them and spoiled nine chisels in one mastoid operation. Either they simply bent over so that the edge was practically double, or they were too hard and large pieces broke out. How would Dr. Corwin guard against that? We have no control over the open market. If the society would appoint a committee, as Dr. Corwin suggested, Dr. Holinger was afraid its members would be in hot water from the very start.

Dr. Corwin, in closing, said that the matter referred to by Dr. Pynchon brought up a very different phase of the question, namely, the pirating by different houses of instruments made by a certain house, which did not appear in the journal as advertised. He had referred in his paper only to journalistic advertising. That is a thing the society could get at.

The medical colleges have been gotten at; also the drug concerns and advertising quacks. The advertising of surgical appliances is just as tangible.

He differed from Dr. Holinger when he implied that the medical profession, as made up of individuals, should paddle its own canoe as individuals, and with no idea of the fundamental proposition that we are our brothers' keepers. Anything we can do to help each other is certainly in line with organized medicine and the ethics of our profession. It is a duty and a privilege to help the other fellow. To let a lot of irresponsible manufacturers misrepresent us to the public is wrong. The matter of the steel not being properly tempered is bad enough, but when an instrument comes out with a ratchet on it that has no function at all, and when such instrument was totally unlike the originator's model, he thought it was time for the profession to act.

He had simply attempted in his brief paper to voice a protest against that sort of thing, and to stem the tide of that kind of misrepresentation as far as possible.

Paper: Report on Twenty-six Cases of Tonsillectomy Two or More Years After Operation.*

By Alfred Lewy, M. D.

DISCUSSION.

Dr. Arthur M. Corwin thought papers of this type might be very valuable in pointing a way for us, not only as operators on tonsils, but in other regions of the body, by taking up the subsequent results and trying to analyze those results in terms of the operations and the indications for those operations. Perhaps we have been too lax in doing that and have overlooked the importance of it. We have hundreds and perhaps thousands of patients who have been operated on for specific things in a specific way, and we do not know today what the conditions of those patients are and how far those conditions can be interpreted in terms of the operation, and of the indications for which the operation was done. Therefore, he would compliment the reader of the paper at the outset for his point of view.

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*See page 592.

Great emphasis could be put on that first proposition, but, as the essayist said, very little of value rests with so small a number of cases. As he referred to laryngitis in one or two cases, it occurred to Dr. Corwin that laryngitis, pharyngitis, dryness and a lot of other symptoms have been reported in the literature, but how far those conditions are referable to the systemic background or other complications or habits and manner of the patients' living, we would have to go into before laying any stress upon the fact that patients have had other conditions following resection of tonsils and removal of adenoids, and just how far these conditions were dependent upon the operation. Of course, that is drawing a long bow, to say that laryngitis in those cases was due to the results of operation. And so with regard to the size of the patient's uvula in those cases. The results seem very uniform. So wide are the results of a beneficial nature, so far as the size and growth and development of the brain and structural function in these cases are concerned, that we do not hesitate to say, where tonsils and adenoids offer a local regional or systemic reason for being removed, they should be removed.

Again, the matter of tonsillotomy under the age of the second dentition the speaker would not discuss, for lack of time, further than to differ from the essayist's position.

Dr. Joseph C. Beck thought the weakest point in the presentation of Dr. Lewy was the fact that these were dispensary cases, and the conclusions which we could draw from these cases are different from those to be drawn from cases from private practice. For instance, the question of hygiene comes in, in the after-treatment, and differs very much in dispensary and private practice. Dr. Beck would like to have a report of ten private cases which had been followed and studied with that point in view—the ultimate result. The question of the ultimate result is bound to be touched on more and more, not only in the matter of the tonsil, but in goiter, appendicitis, and other things.

Dr. Beck has made a study of the question of tonsillectomy in relation to arthritis, particularly, and, as he had said on previous occasions, he could not recall more than two distinct cases that had had pure joint or rheumatic infections that, when operated for the removal of the tonsils by tonsillectomy, had ever had another attack. He had many cases under his observation, adults particularly, who had had arthritis and septic symptoms, who were markedly benefited, so far as their symptoms were concerned, as long as a year after operation. At the end of that time they had recurrences to the degree that they were just as bad as before. It is not a question of the tonsil alone, but other foci of infection that we must study, especially now that the enthusiasm is so great and the work is thrown on the laryngologist. Everything is referred to the tonsil, everything comes from the tonsil, and we are liable to fall into that error and say yes, remove the tonsil, and then see the symptoms come back—the same symptoms that were operated for, particularly in reference to arthritis. He has been very much disappointed in his ultimate results in adult cases of removal of tonsils for the cure of rheumatic affections. There has been a general improvement —that is true—but the actual cure of the condition has not taken place. He would like to hear men who were enthusiastic on that subject express themselves on the ultimate result five years later. He thought the subject was very interesting.

Dr. Shambaugh expressed surprise at the large percentage of unfavorable results in the series of cases reported by Dr. Lewy. He could hardly understand what the indications were for the operation, or, in other words, what they were trying to cure by the removal of the tonsils, where there could be seventeen unfavorable results out of twenty-six operations. The chief indication for the removal of faucial tonsils in children is a history of repeated attacks of acute tonsillitis. Now, in all these cases there is bound to be a favorable result, as the child will not have tonsillitis again. Another indication for the removal of tonsils in children is the presence of very large hypertrophied tonsils, often obstructing the respiration. Here, again, we can have only a favorable result from an operation. If, on the other hand, we remove tonsils which have not been subject to repeated attacks of tonsillitis, and where there is no marked enlargement, because we hope that their removal may have a favorable effect upon, for example, the tendency which the child may have to contract head colds, or because the child has purulent otitis media, I think it not unlikely that we shall be disappointed in most cases in the result. The relationship between the presence of adenoids and persistent nasal catarrh, as well as the persistence or recurrence of purulent otitis media, we all recognize. On the other hand, aside from the acute otitis media and the acute nasal catarrh which follow upon attacks of acute tonsillitis, I am inclined to doubt the tonsils as an important etiologic factor in disease, either of the nose or the middle ear.

Take another class of cases, where the indication for the removal of the faucial tonsils is the existence of a systemic infection which has followed an attack of tonsillitis—for example, an endocarditis or acute Bright's disease. Here I belive that the removal of the faucial tonsil is certainly indicated, as the recurrence of the systemic infection is much more likely to take place through a subsequent attack of tonsillitis than from any other source. The result of the removal of the tonsil in such cases should not be classed as unfavorable, simply because the case happens to develop a recurrence of the systemic infection through some other route. I repeat, that the removal of the faucial tonsils in such cases removes the most probable gateway for a recurrence of the systemic infection.

As regards the arthritides, the situation is quite similar. If a person has an attack of articular rheumatism which follows directly upon an attack of tonsillitis, we all of us accept this evidence that the systemic infection which has caused the rheumatic trouble has gotten in through the tonsils, and in all cases where the joint trouble is at all serious we advise the removal of the tonsils. In most of the cases with a history of this sort the joint trouble will clear up promptly after the removal of the tonsils. In other cases, however, where the relationship between the tonsils and the joint trouble seems to be established from the history, the removal of the tonsils may not result in the immediate clearing up of the infection in the joints. The reason for this seems to be that in some case the infection that has taken place in the joints is sufficient to continue even after the original focus has been removed. In other cases these joints which have once been infected seem to remain sensitive and much more likely to develop acute reactions from sources of infection other than the tonsils. Dr. Shambaugh believes that the cases of joint trouble which distinctly follow upon an attack of tonsillitis, and which are not entirely cured by the removal of the tonsils, do not constitute an argument against the removal of the tonsils in these cases. He pointed out, however, the danger of erring on the side of allowing oneself to do unnecessary things for imaginary tonsil trouble. The speaker has removed a great many tonsils because of systemic infections, such as chronic nephritis, chronic arthritis, neuritis, etc. In all cases of this sort where the systemic infection has not followed directly upon an attack of tonsillitis, or where the presence of foci of infection in the tonsils could not be positively demonstrated, every effort should be made to discover other foci.

Dr. J. Holinger could only say, "I told you so." Four and five years ago he showed cases before this and other societies where tonsils had been removed, and subsequently the patients had complained of practically the same symptoms as before operation. So that is nothing new. But he thinks the profession ought to draw one conclusion, namely, to stop hammering into the people's heads the idea that the removal of the tonsils is a panacea against all and every illness, and especially is this the case in the schools.

Dr. Burton Haseltine thought Dr. Lewy's idea a splendid one, but agreed with Dr. Beck, that it is pretty difficult to judge of the end results in clinical cases. He was quite surprised at the percentage of poor results reported, but he did not think, in justice to Dr. Lewy, they should be discussed without knowing more details as to the conditions existing previous to operation. We don't know how much of the trouble reported later existed before operation; for instance, in the matter of suppurating ears. As he understood the essayist, quite a number of the reported cases were operated for the purpose of relieving or curing the suppurating ears, and in no case was the statement made as to whether the patient was treated after operation or not. It is extremely improbable that removal of the tonsils alone was expected to cure these cases.

He agreed with the other speakers that if we could make records from private practice it would be of far more value, for several reasons: First, the results in private practice are more vital to us; second, we possibly are more conservative in advising operation in private than in dispensary cases. Also, we are more apt to know the end results, since if they are not good, we will hear of them much sooner. So that while he thought the idea was a splendid one, and we should all follow it up, he hoped that other reports would include private as well as clinical cases. Any positive conclusion from such a limited number of cases would be exceedingly questionable.

Dr. Lewy, in closing, said that the gentlemen who criticised the small number of cases were perfectly justified, but the report was gotten up in the hope of encouraging the preparation of other reports of like nature by men who had perhaps more time to devote to it, and could report on three or four hundred consecutive cases. He did not think we could draw any definite conclusions from twenty-six cases.

In each case he stated the cause for which the operation was done, but did not read them all on account of lack of time.

The question of tonsillectomy and tonsillotomy he would not go into either, since Dr. Corwin was kind enough not to start anything, but he presumed the differences of opinion were both founded upon theory.

Dr. Beck's criticism, that the patients were from dispensary practice, and that we cannot judge the results in private practice from those in dispensary work, was, of course, true. Patients in private practice frequently have other treatment than the mere removal of the tonsils, and this is also a factor in the end result; clinic patients more frequently have only the operation to which to credit the result. Also, the fact remains that the very large majority of tonsil operations that are done in the community are done in dispensary practice, and if four or five hundred cases would average as poorly as these twenty-six, we are doing a gross injustice to the dispensary patient, in the way of doing unnecessary operations. He believes that he refuses more cases than he accepts for operation at the Eye and Ear Infirmary—cases that have been referred from the schools—this in reference to Dr. Holinger's remark.

His intention is to follow his cases for a little while and judge the results—the cases that he refuses to operate as well as those in which operation is performed.

Another object of the paper was as a protest against indiscriminate tonsil operation, and he thinks that it is in the clinic that we are a little bit indiscriminate in operating. If the child has had a sore throat, the tonsils are usually removed. The cases should be studied a little more thoroughly.

One of the best indications for removal of the tonsils is frequent repetitions of tonsillitis. The cases in his report that were helped were just such cases.

The removal of tonsils for aural suppurative processes and nonsuppurative deafness is, he believed, commonly practiced. Personally, he could not see the sense of it, as removal of adenoids alone is usually all that is necessary; but it is his experience, in visiting other clinics, that it is considered a good indication for removal of the tonsils, and so also in many of the textbooks.

Dr. Shambaugh did not hear him read the reasons for the paper. He is thoroughly in accord with those who wish to remove tonsils for systemic infection, when they can reasonably show that the cause lies in the tonsil, and when they can find trouble in the tonsil itself, but he is not in favor of removing the tonsils just because they are there and moderately enlarged.

The Unusual Findings in Frontal Sinus Disease.

Dr. J. Holinger, in a paper on this subject, said that an account of interesting indications and findings at operations on the frontal sinuses had been given at different times, especially in the *Muenchener medicinische Wochenschrift* ("Frontal Sinus and Maxillary Antrum Operations"), 1913. Two new cases were added. The first was that of a woman of fifty-five years, treated within the last few years for two acute attacks of inflammation of the right frontal sinus. A fresh attack, apparently worse than the preceding ones, kept her in bed for the last ten days. Hot and cold applications were of no avail. The entire right side of the head seemed red and swollen. The right eye also was swollen. Several groups of blisters seemed to be caused by too hot applications. In the nose, pus was seen laterally and medially to the anterior end of the middle turbinal. Operation was advised, on account of the experience of the preceding attacks, and because the patient begged for immediate relief. Extradural or intradural involvement could not be excluded, but was rather a probability. As soon as the head was shaved, similar blisters were found on the cortex as on the face, but these were strictly confined to the right side of the middle line. A diagnosis of herpes zoster was made. A radical Killian operation was performed, in spite of this new development, because we knew that the sinus was chronically inflamed, and the herpes zoster could well be a consequence of the sinusitis, as the supraorbital nerve often is exposed in the sinus. At the same time the nerve could be stretched. At the operation the sinus was found filled with pus and polypoid degenerated mucous membrane. The nerve was exposed and stretched out of the foramen. The result of the operation was great relief from pain. Slight attacks at great intervals could not be compared with the former suffering. Recovery took more than a month, but is complete.

The second case was that of a man, twenty-eight years of age, a baker, who in May, 1913, fell against a sharp edge with his right temporoparietal region. Was not unconscious, but was sick for several weeks. In September he began to have fierce headaches on that side. In the beginning of October the right eyelids and forehead were swollen. The headache was at its worst in the morning, and disappeared at about three in the afternoon, every day. The frontal sinus was washed daily, affording considerable relief in the beginning. The pain was worst at the place where the trauma occurred and over the forehead. X-ray plates gave no new information. The diagnosis was empyema of the frontal sinus, with probable brain abscess. At the operation, November 11, 1913, an enormously large frontal sinus, reaching from temple to temple, and well into the hair line, was found. In the inner plate a fracture line could be traced in the upper right hand part, in the direction towards the region where the trauma had occurred. The recovery was slow, taking until January. The headaches stopped, but a peculiar pain became more and more circumscribed in the temporoparietal region. This area became smaller and smaller, until it finally was about the size of half a dollar, and could be accurately circumscribed by pressure with the finger or percussion. Finally, this pain, too, disappeared.

Of course, only a postmortem would have cleared up this case, but Dr. Holinger thought the following explanation was not far amiss: After the trauma in May, a brain abscess developed, infected from the close proximity of the frontal sinus. After the operation, when the source of infection was removed, the abscess healed. It is well known that a brain abscess does not need to leave a scar in the brain.

DISCUSSION.

Dr. Otto J. Stein said there is no doubt that, owing to the great variety in the size, shape and position of the frontal sinus, probably more than any of the other nasal accessory sinuses, we have to be on the lookout and alert to the changes in symptoms and pathology of this particular sinus. The cases reported by Dr. Holinger simply warn us of the unusual conditions that are constantly brought to our attention.

Dr. J. R. Fletcher said that the case of herpes zoster interested him very much. He had mentioned before picking up a section of bone of the head in which there was complete dehiscence of the bone. That is, the superior orbital nerve was absolutely exposed in the sinus. Instead of there being a canal, there was dehiscence of the bone. In other words, this nerve was lying in a little notch, the floor of which was the membrane of the frontal sinus. Dr. Fletcher expressed the opinion then that that might occur in cases of orbital herpes, which are seen occasionally.

He had in mind a case that occurred in his own practice in which there were gangrenous spots, and the patient today has quite a number of pits all around the orbit. A neurologist was present that evening, and afterwards he said he would like to remind Dr. Fletcher that all of those cases were dependent upon inflammation of the ganglion. He was perhaps convinced against his will, and has been of the same opinion still, that that was not necessary, that herpes zoster could be caused by having a nerve bathed in pus, where the nerve trunk itself was bathed in pus, and Dr. Holinger's experience seemed to bear him out in that opinion. Perhaps, after all, the condition referred to as occurring in the specimen he showed a couple of years ago would occur in some of those cases where the nerve is exposed—not running in a canal, but running in a groove that is covered on the outside by dura and skin, and on the inside by mucous membrane only. He has the specimen referred to in his possession now. There is no bone between the nerve and the frontal sinus at all. As soon as the nerve was removed the sinus was exposed.

Dr. Joseph C. Beck wanted to speak with reference to the radiogram exhibited by the essayist. He would differ from him that it was a brain abscess case. He thought it was a case of bone necrosis. At least, that would be his reading of the X-ray picture. It looked to him like a scarification of the bone and absorption, as we see it particularly in syphilitic cases, in the early stages.

He has seen these large frontal sinuses, such as Dr. Holinger described, but truly frontal sinuses. In this connection he wanted to speak about the Killian operation in these large sinuses. He did a radical Killian operation in a man who had a very large frontal sinus, very deep. He thought there was a double frontal sinus, from before backwards. Dr. Cavanaugh, who was present, assisted him in the operation. He thought it was a very rare case, but on looking up the literature he found that it was perhaps a very large ethmoid cell behind the frontal sinus, as Logan Turner has shown quite a number of them. The recent work of Warren Davis shows that distinct double frontal sinus does exist. This patient was cured of his frontal sinus trouble, with not a very large deformity; still he has pestered the speaker and probably will continue to do so on account of a socalled scar through his eyebrow, and he imagined the cross incision, employed by Dr. Holinger in his case, would probably be still worse.

He would judge from the paper that Dr. Holinger is doing a lot of frontal sinus work by the Killian radical method. He personally is not doing the frontal sinus work so radically as Killian does; he is trying to avoid it as much as he can.

The X-ray picture of the antrum referred to was not taken in the proper angle, and therefore he did not feel that it would be possible to use it as a guide for operation.

Dr. George E. Shambaugh stated that experience had taught him that most cases of frontal sinus infection can be adequately relieved by intranasal operation. In most cases the suppuration can be stopped entirely; in others, even though the suppuration does not entirely cease, the free opening into the nose relieves the patient from the pain as well as from the danger of an intracranial complication. During the past year he has operated upon two cases where an external fistula into the orbit existed, and in both cases the operation was followed by the immediate spontaneous closure of the fistula and the relief of the discomfort which the patient had suffered because of the obstructed drainage of the nose. The intranasal work for the relief of a frontal sinus abscess includes the thorough removal of the anterior ethmoid cells; that is, of those ethmoid cells which drain into the middle meatus. If the intranasal work is done carefully by one who understands thoroughly the anatomic relations in this region, the patient is not exposed to any serious danger. The speaker has operated on a great many frontal sinus cases in this way, and has never had a dangerous sequel. The external operation, as devised by Killian, may have to be resorted to in the few cases where adequate relief cannot be obtained by intranasal work, but these cases are extremely rare. A patient who is free from pain and who understands that the danger of an intracranial complication is in a large measure removed by the establishment of free drainage into the nose, is usually much happier, even with the continuance of some nasal discharge, than he would be to have a scar such as is always left by a Killian operation.

Dr. Holinger, in closing, said that he thought he was conservative in his operations on the frontal sinus. In neither of the cases reported did careful intranasal work, carried on for a long time, relieve the patient.

The case of herpes zoster had been treated for several acute attacks before. There was absolutely no difficulty in getting into the sinus for ventilation and washing. Neither the patient nor the speaker is sorry that the radical operation was performed. The patient was very grateful that the fierce pains stopped after the operation. No other means could have produced that result.

Regarding the other case, of probable brain abscess, he would only say to Dr. Beck that there was no syphilis in the case. There was no indication for suspecting any other disease of the bone.

Dr. Beck asked if there was no injury.

Dr. Holinger said that of course there was an injury, but it was not visible, as it occurred seven months previously. We know that after a trauma to the skull there are sometimes fractures of the inner plate, followed by abscess of the brain. It seems quite plausible that at the time of the injury a fracture line ran from the place where the injury occurred down into the inner plate of the enormously large sinus, and that the infection traveled from the sinus along the fracture line to the lacerated brain tissue.

As to the deformities following the Killian operation, he does not see many deformities following it, and he does not see either how he is going to limit his indications for the operation. He always treats patients intranasally, but, as he said, everything has its limitations, and in neither of the cases that he has operated so far, would he have seen any possibility of a lasting result from intranasal work.

Paper: Pemphigus Involving Primarily the Mouth and Throat, With Report of Cases.*

By Robert Sonnenschein, M. D.

DISCUSSION.

Dr. W. T. Mefford asked the doctor what these people die of—what is it that kills them—what are the pathologic findings, other than the local sore? Again, he would like to ask the doctor whether he has tried autogenous vaccines. It seemed to the speaker that this was a field for their use.

Dr. Otto J. Stein recalled a case of pemphigus which he saw when a medical student, and it made a great impression upon him. These cases are very rare, of course, to nose and throat men. The dermatologists formerly looked upon them as quite rare, but now they do not seem to be quite so infrequent. The case referred to was very extensive, involving the skin over the entire body, and also the mucous membrane of the mouth, throat and trachea, and the entire intestinal canal, as was later shown by autopsy. He received the impression at that time, from the professor who demonstrated the case at the clinic, that almost all of these severe acute cases died. The case was so extensive, and made such a vivid impression on his mind, that he has often thought of it in connection with other eruptive diseases that he has seen at different times since, although he has never seen a case that he could call acute pemphigus.

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*See page 619.

He also referred to the cases that were seen at St. Louis in November—chronic cases of the mouth and throat, which were very interesting.

Dr. Joseph C. Beck said that Dr. Stein's remarks reminded him of a case in his family. An old lady, now ninety years of age, about fifteen years ago had an acute pemphigus, ot the giant form of blebs, and was seen by a number of men expert in this line. They all gave an unfavorable prognosis, and said she would die from this disease. At that time a paper appeared in the *Journal of the Americain Medical Association* by a man in Chicago—Dr. Dubs. He had just returned from Europe and reported a case that he had treated at Kaposi's clinic of that type that recovered. This was the treatment: He placed the patient in a bath tub, in bicarbonate of soda solution, and kept her there for nine days, daily coming and opening a number of these large bullæ, and never taking the patient out of the water. She was kept there under stimulants of brandy and being fed all she would eat, and she recovered. She had pemphigus of the mucosa also.

Dr. J. R. Fletcher a few years ago had the good fortune to see a case of acute pemphigus of the hemorrhagic form, the blebs being of about cherry size. The same day he also saw a case of herpes. In both cases the blebs were on the pharynx—very distinct, and but for the color in the case it would have been very difficult to have distinguished them. At least, that was his conclusion. Mere inspection of the case would not have gone very far.

As he understood it, these cases are more numerous abroad —either they are discovered more often, are better diagnosed, or else it is true that they are more numerous there than here. He thinks we ought to look out for them. A colleague a few days ago mentioned a case to him in which the diagnosis was urticaria. Of course, that does not necessarily form blebs. They were wheals, more or less, but he said that on the top the membrane was somewhat eroded and had a whitish appearance. The speaker wondered whether the diagnosis was correct, or whether it was a case of pemphigus or herpes.

Dr. Sonnenschein asked if they were small vesicles on the pharynx, to which Dr. Fletcher replied in the affirmative.

Dr. Sonnenschein asked how long they had been present, and Dr. Fletcher said only a very short time, as he understood it. They were perfectly new blebs.

Dr. L. W. Dean, of Iowa City, said that the only case of pemphigus that he had ever had was in the hospital at the present time. The patient came under his care for the first time nine years ago, and at that time had pemphigus of the skin, conjunctiva, cornea, and some blebs in his mouth. Treatment was not very successful, and the patient came to Chicago, went from Chicago to New York, from there to Berlin, and from there returned to Iowa, the pemphigus continuing in spite of treatment received in each city. It did not do much damage in the mouth. It was a chronic case. He lost his vision in one eye. He developed entropion, with ulcer of the cornea, and lost the vision in the other eye, when the chronic pemphigus disappeared. He came under the speaker's observation then, and he sent him to the college for the blind. He developed measles. He has had no nodules for four or five years. This had seemed to him a very unfortunate, but very interesting case, from the very beginning up to the present time.

Dr. Sonnenschein, in closing, and answering Dr. Mefford's question, said that vaccines were not tried in this case because, in the first place, he did not think of using them; second, about six weeks after first seeing the patient he was seriously injured and only knows the rest of the history from the other physicians. Regarding the cause of death, he does not know that that is definitely known, except that gradual emaciation and cachexia appear, as in other toxic conditions, and apparently that was the cause of death in the case reported.

As to Dr. Stein's statement, dermatologists do see these cases, but those are the cases that show themselves on the skin, and which are easy to diagnose. The point he wished to make was that diagnosis was made by expert dermatologists before the lesions appeared on the skin; in fact, in this case the lesions appeared on the skin very late in the disease.

Dr. Beck's case was an acute one, and at the same time showed lesions in the mouth. That is very rare. The essayist had tried to emphasize the point that the acute cases, beginning with the lesions in the mouth, are almost invariably fatal in a few months.

Dr. Fletcher's case, with blebs in the pharynx, was a very unusual condition, because these blebs usually, as Chiari has shown, burst shortly after formation.

Regarding Dr. Dean's case, the lesions may recur and disappear for a long period of years.

The point made in the paper was simply with reference to the acute lesions in the mouth.

Dr. Fletcher said that he had seen the two cases he referred to in Chiari's clinic.

BOOK REVIEWS.

Operative Surgery of the Nose, Throat and Ear.

For Laryngologists, Rhinologists, Otologists and Surgeons. By Hanau W. Loeb, A. M., M. D., Professor of Ear, Nose and Throat Diseases in St. Louis University, in collaboration with Joseph C. Beck, M. D., R. Bishop Canfield, M. D., George W. Crile, M. D., Eugene A. Crockett, M. D., William H. Haskin, M. D., Robert Levy, M. D., Harris P. Mosher, M. D., George L. Richards, M. D., George E. Shambaugh, M. D., and George B. Wood, M. D. In Two Volumes. Vol. I. Four Hundred and Nine Illustrations. St. Louis: C. V. Mosby Company, 1914.

There has long been a place for an up-to-date treatise on the surgery of the nose, throat and ear. The large experience which the editor has acquired in medical work is a guarantee in advance that the subject would be properly presented. He has associated with himself in the preparation of the work a group of men whose reputation is national: Joseph C. Beck, R. Bishop Canfield, George W. Crile, Eugene A. Crockett, William H. Haskin, Robert Levy, Harris P. Mosher, George Shambaugh and George B. Wood. The work is in two volumes, of which this is the first. The paper is good, the type is clear, and the illustrations, of which the volume contains many, are for the most part original and well executed. Decided credit is due the publishers, Mosby & Company, for the get-up of the book.

Volume I covers the surgical anatomy of the nose, pharynx, larynx and neck, by Dr. Loeb and Dr. Wood; the external operations of the larynx, pharynx, esophagus and trachea, by Dr. Crile; laryngoscopy, tracheoscopy, esophagoscopy and gastroscopy, by Dr. Mosher; and plastic surgery of the nose and throat, by Dr. Beck. Volume II will be devoted to the more specialized surgery of the parts under consideration. The text is surprisingly free from errors.

Chapter I, dealing with the surgery of the anatomy of the nose, is by the editor-in-chief, and is clear and concise. It embodies his own special investigations upon the size and position of the various accessory sinuses. With one or two of his statements, however, we are at variance. On page seven he states that it is necessary usually to resect the middle turbinate in order to probe the sphenoidal sinus. This we have rarely found necessary to do. On the same page he states that the two lower turbinates, the inferior and middle, extend about the same distance forward. Certainly in the specimens with which we are acquainted, the inferior is found considerably in advance.

Chapter II, by Dr. George B. Wood, deals with the surgical anatomy of the larynx, pharynx and neck, and Chapter III with the surgical anatomy of the ear, by Dr. George E. Shambaugh. Both of these are well written. Shambaugh's opening sentence, that the anatomy of the ear cannot be gained from textbooks nor by operations upon the cadaver, will be supported by every aural surgeon. He urges with great justice the continual study of specimens in order to acquire the proper knowledge. The chapter on the external surgery of the larynx, pharynx, esophagus and trachea (Chapter IV), from the pen of Dr. George W. Crile, is peculiarly welcome, inasmuch as it represents the views of one who is recognized as a master in this field of surgery. It is an exceedingly practical presentation of the subject, covering the special difficulties and dangers, the selection and care of the tracheal canula, emergency and planned tracheotomy, laryngectomy. esophagotomy, stenosis of the larynx, cancer of the pharynx and esophagus, excision of the tonsils for cancer, and operation for diverticula of the esophagus.

Chapter V, by Dr. Mosher, deals with laryngoscopy, bronchoscopy, esophagoscopy and gastroscopy. It covers one hundred and twenty-three pages, and is the clearest and most authoritative presentation of the subject in English since Jackson's book appeared. It is replete with illustrations, and the information given is so explicit as to cover almost every condition which may arise. The author's well known views in regard to the use of general anesthesia for esophageal work and the employment of large tubes are set forth at length. There is, however, no attempt to insist upon this procedure to the exclusion of local anesthesia and the usual size tubes. The author's method of employing both distal and proximal illumination, as the case may present itself, is undoubtedly the right position. Particularly valuable are the sections dealing with the treatment of stricture of the esophagus and of spastic stenosis of the esophagus, with both of which the author has had a large experience.

The concluding chapter of the book is upon the plastic surgery of the nose and ear. It is by Dr. Joseph C. Beck. We know nowhere of so capable a presentation of the subject. It deals with the history of the subject, and then gives a detailed description of the various operations, external and intranasal.

If Volume II, yet to appear, equals in merit the present volume, the work will be one that every specialist cannot fail to have in his library. *Harris.*

Nasal Accessory Sinuses.

Development and Anatomy of the Nasal Accessory Sinuses in Man. Based on two hundred and ninety lateral nasal walls, showing the various stages and types of development from the sixtieth day of fetal life to advanced maturity. By WARREN B. DAVIS, M. D., Corinna Borden Keen Research Fellow, Jefferson Medical College, Philadelphia. Octavo of 172 pages with 57 original illustrations. Philadelphia and London: W. B. Saunders Company, 1914. Cloth, $3.50 net.

It must be accepted that this work is a distinct addition to the literature on nasal accessory sinuses. A part of it deals with a subject which is not often dwelt upon and seldom if ever sufficiently illustrated to make the rather obtuse study of embryology clear to the mind of the average laryngologist. This book belongs to the atlas class of publication in that the illustrations are by far the most important part of the work. Out of the 170 pages only 53 are devoted to the text inclusive of tables. The rest of the book is taken up with really beautiful illustrations, most of them life size. The material on which the work is based consists of fourteen embryos and fetuses under one hundred and thirty-five days old, and eight fetuses between one hundred and thirty-seven and two hundred and forty-six days, four full-termed fetuses and one hundred and one postnatal heads. This gives a grand total of one hundred and forty-five heads, meaning an examination of two hundred and ninety lateral nasal walls and accessory sinus areas. The author states in concise form his method of obtaining the material at autopsies and the necessary technic for the subsequent examinations. The early embryology of the nasal cavities is given in a general consideration of the subject, and the late embryology treated in each chapter pertaining to the particular sinus discussed. The text is clear and concise, and for the small size of the book covers the subject in a very complete manner. The best part, however, is the illustrations. They consist of excellent reproductions of drawings from the author's sections and dissections, well elucidated with attached text, and sufficiently numerous, not only to cover all possible normal relations, but also to cover some of the more common varieties.

The book is exceedingly well gotten up, well printed with large clear type on a good quality of paper. When in addition to this excellence of publication we consider the wealth of material from whence the data was drawn, we can scarcely fail to give this little atlas a very warm recommendation to those who are interested in the accessory sinuses.

Wood.

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LV.

FURTHER OBSERVATION ON SOME ANATOMIC AND CLINICAL RELATIONS OF THE SPHENOID SINUS TO THE CAVERNOUS SINUS AND THE THIRD, FOURTH, FIFTH, SIXTH AND VIDIAN NERVES.*

BY GREENFIELD SLUDER, M. D.,

ST. LOUIS.

Last May it was my privilege to present this subject to this association in the shape of a preliminary report. Now I should like to add a note to it. The subject is a large one and clinically deals with a most difficult class of cases. It may be recalled that the question of the etiology and treatment of migrain was raised in that report; and the statement made that I believed many (but not all) of the recurrent headaches that bear the name migrain are sphenoidal empyemata that had lost most if not all local signs; or were started as such empyemata; and that the nerve trunks had become involved either by extension of the inflammation (or its toxin) through the thin wall separating the sphenoid sinus from the adjacent nerve trunks. The results (case reports) that I might now submit, although a goodly number, are too recent to permit of conclusions. I feel that these results should stand five years before conclusions are drawn. As far as they go, however, they strengthen my belief in the correctness of the deductions detailed in that report.

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*Read before the American Laryngological Association, May 5, 1913.

I desire now specially to record an anatomic observation and to mention a conclusion drawn from clinical observation as far as it has gone.

Last May I cited that the treatises on anatomy usually gave the impression that the trunks of the third, fourth, fifth, sixth and Vidian nerves were well (far) separated from the sphenoid sinus. During the year an additional number of volumes have been consulted, but no exception to this rule has been found. The observation that the third, fourth and the three divisions of the fifth, sixth and Vidian frequently lie in close association to the sphenoid sinus was a deduction from specimens which I had studied by cross sections. Two months later (July 18, 1912), Ladislaus Onodi,[1] reported an anatomic investigation of this same district, with corresponding findings, save for the Vidian nerve, which he did not observe. His method was to follow the nerve trunks in certain specimens, sometimes to remove the wall of the sphenoidal sinus, and then to study the relations of the nerve trunks thereby exposed. He found that they were in these close associations for varying distances, sometimes even as much as twenty millimeters. He did not consider the cavernous sinus in these relationships. He pictured specimens, however, where the sphenoid sinus extended close to the clivus of Blumenbach—so close as to make transparency of the separating bone—and showed how this brings the sixth nerve into these associations. I have not such a specimen. Five years ago, while looking over the exhibit of Dr. Mosher in the Harvard Medical School, I saw a number of such; but none of sufficiently thin wall to suggest their being classed with such material as I drew my conclusions from. It is interesting to know the length of such contacts; but I believe this to be of secondary importance to the fact that the exposure or contact exists, however short or long. Last February I enjoyed the personal favor of an inspection with Dr. Warren B. Davis, Keen Research Fellow of the Jefferson Medical College, Philadelphia, of his matchless collection of one hundred and forty-five Caucasian specimens, showing the nose and accessory sinuses from the eighth week of fetal life to the twenty-fifth year uninterrupted, several specimens for each year (save the eleventh year, of which there is only one).* With his sanction I now record the observation made then, that the sphenoid sinus spreads laterally at an early age, reaching to close proximity to the second division of the fifth as early as two and one-half years; and that this condition runs almost constant throughout the series. Its development (Davis) begins on the anterolateral aspect of the body and slowly extends backward. It, however, spreads rapidly laterally, to approach the foramen rotundum, and then proceeds backward. As early as the sixth year the Vidian canal may be approached.

These observations seem to me of great importance. They furnish anatomic findings to correspond with the clinical histories of this class of cases, i. e., that the neuralgias frequently begin quite early in life. For if I be right in the conclusion that the mode of production of these headaches—the pathologic sequence—is the close association of the sphenoid sinus to these nerve trunks, and that the inflammatory processes are transmitted through the thin bone separating the cavity of the sphenoid from the associated nerve trunks, it is necessary that such anatomic associations be formed in early life, as an explanation of such headaches beginning in early life.

Last May I made the statement that I thought the pathologic process underlying these cases to be a hyperplastic sphenoiditis. A year more of clinical observation strengthens this belief, although some cases are certainly not such, according to their clinical behavior, and bone removed from some of these patients was declared to be normal by Dr. E. L. Opie.

From an observation of about one hundred cases it has seemed that the second division of the fifth and the Vidian are the nerves most frequently involved (ninety-five per cent). They may be involved singly or together, then making the picture which would otherwise emanate from the sphenopalatine ganglion. The year's observation leads me to feel it to be more difficult than I once thought to separate this class of cases from sphenopalatine ganglion neuralgia,[2] so that I feel that one ought to be carefully on guard for this differentiation.

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*These specimens were secured by the ingenious technic which Dr. Davis was clever enough to devise, and which he will publish in his monograph giving his observations on the collection.

The third nerve is rather frequently involved, but I cannot now give percentages. Such patients are usually unconscious of a difference in their pupils, but upon observation show this difference with almost every coryza. Observations relative to the fourth nerve are not so readily made. So far I have not seen a case of sixth nerve involvement belonging in this category.

During the year I have tried for intrasphenoidal use three medicines not mentioned in the first text. Iodid of potassium in water (two per cent to five per cent) proved to possess nothing upon which its use may be recommended. It is apparently inert. One per cent chlorotone in water proved to lack recommendations. The proprietary "cresatin" also failed to prove better adapted for these purposes than carbolic acid or oil of wintergreen.

The medicines which have so far given the best satisfaction are one per cent carbolic acid in oil, two per cent to ten per cent oil of wintergreen, and aqueous solutions of sodium salicylate, two to five per cent. These have been successful in allaying the pain long after the sinus was satisfactorily opened and the wound healed.

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LVI.

THE VALUE OF EYE SYMPTOMS IN THE DIAGNOSIS OF OBSCURE CHRONIC SINUS DISEASE.*

By Luther C. Peter, A. M., M. D.,

Philadelphia.

There is some difference in opinion as to the frequency of eye symptoms in sinus disease. This is due to several causes. First, the average sinus case is not referred to the ophthalmologist for careful study unless eye symptoms are so pronounced that the patient is conscious of damage to his sight.

Second, ophthalmoscopic examinations in retrobulbar conditions are frequently negative, and a careful study of the fields for form and color is often omitted when central vision is good and the eye ground is negative.

Third, the character of the sinus disease, as to whether it is acute or chronic, will influence the observations as to the relative frequency of eye complications.

The diagnosis of acute sinus disease, as a rule, is more readily made than the more serious chronic form—the latter being more serious because of its chronicity and the resulting irreparable damage to the sinuses and the structures surrounding them. Eye symptoms are not infrequent complications in the acute period, but diagnosis, as a rule, is made and treatment instituted before serious damage is done to the eye structures. This possibly gives rise to the erroneous impression that eye symptoms are not common in sinusitis. It is, however, in the chronic variety that we meet with the really grave complications, and among these complications the eye is most frequently involved. A casual glance at the human skull, with almost parchment-like walls separating the orbit from the sinuses, and a knowledge of the blood vessels and drainage system of the nose and orbit, should be convincing evidence that chronic disease of the sinuses must, in time, extend to the orbital structures, if the progress of the disease is not stayed. This, therefore, should serve as a warning to be on the lookout for eye symptoms in chronic sinusitis.

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*Read before the North Branch of the Philadelphia County Medical Society.

From a clinical standpoint we have abundant evidence of the coexistence of disease in these structures, and in many instances the eye furnishes the clue to the situation. I do not intend to give you a classified list of changes which we find in eye complications, but wish to call attention to a few which will not only help the rhinologist, but the general practitioner as well, to arrive at definite conclusions in some of these puzzling cases.

The avenues of extension of disease of the sinus to the orbit are practically two—either by contiguity, or through the lymph and blood vessels. So close are the posterior ethmoid and sphenoid walls to the orbit that necrosis of the walls of these sinuses means necrosis of the orbit. The dural sheath of the optic nerve is continuous with the periosteum of the orbit as the nerve passes through the orbital canal. The optic nerve, therefore, is unprotected, and the nerve is open to the slightest inflammation. Strange as it may seem, the periphery of the nerve, and the part directly in contact with the point of inflammation, does not always show the evidence of disease to the same extent as the central bundle, known as the papillomacular bundle, of nerve fibers. This highly specialized bundle which carries impressions to and from the macula and brain, and composes about one-third of the diameter of the nerve, is centrally located in this region. Possibly the resulting scotoma or blind spot is one of the earliest evidences of optic nerve involvement in chronic sinus disease. It is erroneously assumed by some that this papillomacular bundle in the orbital canal comes very close to the surface, and for this reason promptly suffers in chronic sinus troubles. A short distance back of the globe, it does approach very close to the surface; but at the part of the nerve which probably is the seat of disease, shortly after it passes through the optic foramen, this bundle occupies the center of the optic nerve. It is at this point that damage to the nerve first appears. It is also interesting to note that in the retrobulbar neuritis due to toxemia of sinus disease, as in other forms of toxemic retrobulbar neuritis, this papillomacular bundle of nerves is usually first involved. This is due to the fact, possibly, that these nerve fibers are more highly specialized, and therefore more delicate in structure, than the rest of the optic nerve.

Cases in which eye symptoms are of most value, as a rule, consult the ophthalmologist first, and are referred by him to the rhinologist for surgical intervention. The usual symptom is a rapid lowering of vision in one eye. In my work I have learned to look upon a rapid unilateral lowering of vision, without apparent cause, as pathognomonic of chronic disease of one or more of the sinuses—usually the posterior ethmoid and sphenoid—and occasionally antrum disease. The frontal sinuses rarely give rise to this condition.

The following cases confirm this:

F. F., aged seventeen years. Admitted to hospital September 5, 1913. Gradually lost vision in the right eye during ten days previous to admission; can now only see hand movements at one foot; has no pain, no discharge from the nose. Eye grounds are negative, except for slight venous engorgement in the right eye and some striation of the retina. A tentative diagnosis of probable sinus disease was made. He was placed under pilocarpin sweats daily, and was referred to the rhinologist for examination. The first report from the nose and throat department was "probably negative." An X-ray examination and removal of the middle turbinate on the right side were requested. The X-ray showed a shadow in the right antrum. The middle turbinate was removed on the right side, and the posterior ethmoid and sphenoid cells were found to be necrotic and contained pus. Curettage and drainage were followed immediately by rapid rise in vision, and now central vision is 20/20.

The case illustrates the rapidity of the onset of the diffuse retrobulbar neuritis—requiring five days to be so marked as to reduce sight to hand movements at one foot. He further illustrates the dangers of such a condition. Notwithstanding prompt relief, he now has a secondary atrophy of the optic nerve of moderate degree. A fact worthy of noting is this—that improvement in the eye condition remained stationary four or five days after opening up of the ethmoid and sphenoid, and improvement was again observed, and remained permanent, after tapping and irrigating the antrum on the right side, which also contained pus.

The second case illustrates a slightly different phase of eye complication. His history is, briefly, as follows:

Mr. L., aged twenty-three years, called at the hospital on the 22d of September, complaining of lowered vision in the right eye. A month previous to this he had four polyps removed from the right side of the nose. Twenty-four hours after the operation the face was swollen, the lids closed, and in a short time sight was reduced to hand movements at one foot. Pus accumulated in the orbital cavity and was released by an incision in the lower lid. Recovery was prompt and vision improved. He consulted us because his vision again became lowered. Careful examination of the nose was made, and five large polyps were again removed from the right side of the nose. The ethmoid and sphenoid cells were curetted and irrigated, with the immediate improvement of vision from 20/70 to 20/30.

It is interesting to note in this case, also, that improvement was not complete until the antrum on the same side had been trephined and irrigated and relieved of its pus contents. This patient has clearly pointed out a symptom which is common among these chronic sinus diseases—namely, a central scotoma. The patient complains of a white object, especially on looking towards the right. When his field was carefully mapped out, we found that he had a pericentral scotoma—the more central of the macular fibers having escaped. This, therefore, is an illustration of disease of the optic nerve by pressure upon the sinus walls—the enlarged polypoid growth having closed up the ethmoid and sphenoid openings, thereby causing retention of pus. The patient now has a mild form of optic atrophy, following the retrobulbar neuritis.

Neuroretinitis is more common in acute forms, from direct pressure, and when present is usually recognized because the patient complains of lowered vision. The fact, however, that the patient does not complain of visual disturbance, does not guarantee an intact visual field. If sinus diseases were routinely referred to the ophthalmologist for joint study, many early evidences of eye complications might be detected, and permanent damage to the visual tracts might be avoided. We are apt to forget that scar tissue in the nose may not be serious, and may not cause inconvenience to the patient—but scar tissue in the optic nerve and retina means irreparable damage.

A word as to the enlargement of the normal blind spot. I have never been able to observe an enlargement of this normal blind spot, except in patients in whom papillitis or neuroretinitis was present. What may be mistaken for an enlarged blind spot is a central scotoma, in which the more central fibers of the macula have escaped damage. This is not unusual, and the second case reported is illustrative of this form of scotoma.

Unilateral loss of accommodation and disturbance of muscle movements and muscle balance are occasionally observed. Either symptom, however, is usually accompanied by other ocular manifestations which are more pronounced. I have referred in the beginning of my paper to the fact that many of these cases with visual complications may show no change whatever in the ophthalmoscopic picture. The importance, therefore, of careful studies with the perimeter and scotometer must be apparent at least to those who do eye work. The fact that the peripheral retinal layers contain relatively few rods and cones, that they are insensitive and record relatively few impressions, often prevents a hurried and perfunctory study on the perimeter from showing any marked peripheral change. More careful study of this peripheral retinal area sometimes reveals narrowing and cutting in the fields quite as early as the changes which are characteristic in the macular region.

From this hurried discussion of some of the eye complications of chronic accessory sinus disease, you will observe that they practically fall into two groups: First, gross changes, or those which may be observed, at least in their effects on the optic structures, by one who is not especially skilled in ophthalmic examinations; second, those changes which can only be determined by most careful technical examination.

Of the value of the former group of changes there can be no question. When present they are part of the symptom complex of chronic disease of the sphenoid, posterior ethmoid and antrum. The latter group is of even greater value, because they serve warning of approaching damage to the optic nerve, and, as a rule, this warning is served in time to avoid serious permanent injury.

Conclusions which force themselves upon us, from a study of these cases, are: First, that chronic disease of the accessory sinuses should be studied not only from a rhinologic, but from an ophthalmologic standpoint as well; second, such studies should be made early, even though no gross optic nerve involvement is manifest; third, when gross evidence of disease of the optic nerve is present there should be no hesitancy in promptly sacrificing the middle turbinate to thoroughly open up the sphenoid and ethmoid cells; fourth, all accessory sinuses should be explored to determine their condition when eye complications appear.

LVII.

LEPROSY OF THE UPPER RESPIRATORY TRACT, WITH REPORT OF A CASE.

By John Horn, M. D.,

New York.

Cases of leprosy, not being endemic, are comparatively rare in this country. Up to the present time relatively few cases have been observed in the United States, and such as have been seen were of the mild type, which accounts for their undetected passing of the quarantine station. In 1902 the United States Leprosy Commission found two hundred and seventy-eight cases in this country. Of these individuals, one hundred and eighty-six probably contracted the disease in this country; one hundred and twenty were born in foreign countries, and one hundred and forty-five were native born. The Sandwich Islands became infected in the nineteenth century.

The contagiousness of leprosy appears to have been recognized at a very early period. In 636 A. D. leprosy houses were instituted in Italy and other countries, and the practice of segregating lepers soon became general. It is a prehistoric disease, having been first known in Egypt and the Orient. About 345 B. C. it was found in Greece, and in about the first century B. C. in Italy, and later extended to other European countries. In Great Britain it is known to have existed as early as the tenth century, and from this country it was carried to Iceland and Greenland. South America and the West Indies were most likely infected from Spain. Its causative factor, a small bacillus, was first described by Hansen in 1870, who found it in the tissues, both extra- and intracellular. In its morphologic and tinctorial qualities the leprosy bacillus resembles the tubercle bacillus. Experiment animals seem to be nonsusceptible to infection, and up to now there has been no success in growing the bacillus on artificial media, though Arning claims to have transmitted the disease to a rabbit.

It is thought that the disease is chiefly disseminated by the secretions, mostly from the nose and upper respiratory tract, as well as from the surfaces of leprous ulcers, though the bacilli from the secretions seem to be of a degenerate form, and this may lessen their infectiousness in these substances and account for their low character in this respect. Intimate and prolonged association with the diseased and uncleanliness play an important rôle in its transmission; the wife of a leprous husband eventually becomes infected, and the children of lepers often develop the disease in early life. Indirect contact may have something to do with its transmission, as witnessed by the number of lepers among the laundresses in an infected locality. Almost constant and early appearing lesions in the nasal passages led Stricker to believe that the latter constituted the chief infection atrium. Hereditary acquisition is now doubtful.

A characteristic of the disease is the presence of large masses of bacilli in the leprous tissue; they are mostly intracellular and in groups, and are probably carried to distant parts of the body through the lymphatics. Characteristic also of leprous tissue are the large vacuolated cells, the lepra cells of Virchow, and the globi of Hansen, which are filled to bursting with the leprosy bacilli. These bodies were considered by Unna and others as zoöglear masses rather than intracellular accumulations, and Kanthak interprets them as bacillary thrombi in the lymphatic vessels. The nodules or lepromas consist of granulation tissue containing many round and epitheloid cells, lepra cells, and occasionally multinuclear giant cells. While the bacilli are most numerous in the nodules, they are also found in any organ or tissue invaded by the disease, such as the liver, spleen, kidney, the nerves, blood vessels, etc. It is thought that the bacillus secretes little or no soluble toxin. Failure to cultivate the bacillus has prevented the preparation of a suitable serum. It seems probable that all men are susceptible to leprosy under proper conditions. Santon states that children from four to five years are particularly liable to infection. (In the above description liberal use has been made of Rickett's[1] work.)

Many of us are only familiar with leprosy from paper illustrations, though the writer was fortunate enough to have a leprous patient referred to him on account of severe hoarseness and because the larynx showed a definite picture of leprous involvement. This case has up till now only been presented to dermatologists. To the laryngologist, of course, the cutaneous lesions are only of secondary interest, and only the condition of the upper respiratory tract and the laryngeal lesions in particular will be considered here. Before describing the details of the larynx and the observations made of the leprous patient by the writer, it may be opportune to briefly abstract from the lepra literature of the past concerning the invasion by leprosy of the upper respiratory tract and larynx; among the chief observers were Arning,[2] Schmidt,[3] Gerber,[4] Manges,[5] Hollmann,[6] Fox,[7] Kerl,[8] Bergengrün,[9] and Babes,[10] who all agree that leprosy shows a predilection for affecting the upper respiratory tract. Otherwise the leprous infiltration seems to advance from the cutaneous surface to the nasal cavities, often limiting itself to the anterior portion rather than to the postnasal and nasopharyngeal cavities; yet that the nasopharyngeal cavity is affected was shown by Arning's study of the lepra cases on the Sandwich Islands, where a great many of these cases have shown the leprous infiltration involving the oropharynx at various stages of development.

Schmidt examined a case of laryngeal leprosy and found the epiglottis thickened by a cauliflower excrescence, whitish in appearance, the aryepiglottic folds also thickened and nodular, and a small nodule was seen on the right false cord; in this case also the uvula was thickened, granular and covered by fine cross ridges; the hard palate also showed a bluish nodule. In these cases the leprous nodules of the mucous membrane are soon cause for complaint, and as they grow larger by increasing infiltration and more numerous, narrowing the lumen of the nasal cavities, pharynx and larynx, an element of danger is added to the discomfort of the leprous patient. More severe than the nasal and pharyngeal distress is, of course to be expected from the laryngeal stenosis.

Bergengrün differentiates three stages of mucous membrane lepra: (1) The stage of catarrh and erythema, (2) the stage of infiltration and tumor formation, (3) the stage of tumor necrosis with subsequent scar formation.

Laryngitis lepra begins at the epiglottis, the vocal cords becoming affected much later. The clinical symptoms are portrayed as beginning with an irritable cough, produced by a ticklish sensation in the throat, being soon followed, however, by harassing cough with expectoration, to which is soon added hoarseness and eventually aphonia. The swelling and infiltration of the larynx by tumor masses, causes narrowing of the glottis and dyspnea; during the necrotic stage small particles of necrosed tumor or particles of food may close this small aperture and be the cause of choking spells. Babes, coincidently with Kalindero, was the first to describe the tumor formation of the larynx in leprosy. He claims the larynx is affected quite early in the disease, erosions and fine granulations being observed on the epiglottis, the disease process then extending to the arytenoids and vocal cords. In all cases the increased infiltration of the affected tissue assumes a remarkable coarse form of change, appearing as yellowish red, sometimes bluish, nodules, having often a glistening white center. In the oropharynx the tonsillar pillars, tonsils, postpharyngeal walls, and the hard and soft palate may be infiltrated with leprous nodes; in the larynx, the epiglottis, aryepiglottic folds, arytenoid cartilages, false and true vocal cords, and the subcordal and tracheal mucous membrane participate in the pathologic process. Coarse ridges are oftentimes formed by the coalescence of several nodules. Disintegration of these leprous nodules into necrotic masses often entirely destroy by this process the bony and cartilaginous framework of the upper respiratory passages. Different stages of nodular development in this region are observed in close proximity in the one individual, large and small nodules uniting to form ridges, tumor formation and consecutively perichondritis, necrosis and edema.

The possibility of mistaking leprosy of the larynx for a tubercular or syphilitic process is not so remote, particularly when the leprous process presents an ulcerated form. In differential diagnosis it is important to keep in mind the fact to which all observers assent, that lepra of the upper respiratory tract is always a secondary disease process, whereas tuberculosis and lues of the larynx and nasopharynx are not at all seldom of primary origin. All leprous cases sooner or later show laryngeal involvement. In doubtful cases for differentiation recourse must be had to bacteriologic and histologic examinations, or else to inoculation of laboratory animals, which may prove of some worth; as noted before, Arning claims to have been successful experimentally in causing lepra in a rabbit by inserting subcutaneously into the animal pieces of human leprous tissue; he also successfully inoculated with leprosy a healthy condemned criminal shortly before his execution on the Sandwich Islands.

Laryngeal stenosis is the threatening danger in this insidious disease of the upper respiratory tract, and to relieve this condition tracheotomy is indicated. For leprosy as an infectious disease in general we know of no curative remedy, and the treatment can be only symptomatic and palliative, relieving the neuralgic and paresthetic phenomena as they arise by narcotic drugs, and attempting to improve the general condition with tonics and stimulants. Cauterization and curettement may temporarily improve, but have no permanent healing tendencies. The disease may extend over several decades, but often the patient succumbs at an early stage of the disease from exhaustion.

CASE REPORT.

Summarizing the family and clinical history, condition of the larynx on laryngologic examination, the therapy and subsequent course of the disease, the report is as follows:

L. T., female, single, aged twenty-seven years, native of Kurland, German Russia, came to the United States nine years ago. Her mother died of leprosy five years ago; the other members of the family have so far remained exempt from the disease. Other than an hereditary acquisition, no direct form of infection can be elicited from the patient. Before coming to the United States the patient was under special treatment for some nasal affection, which at that time, no doubt, was an unrecognized leprous infection of the nose, and this was likewise overlooked by our quarantine officers upon her entrance into this country. Six years ago the patient came to Dr. Ludwig Oulmann, of New York, for dermatologic treatment, and from the clinical symptoms as well as from bacteriologic examination the diagnosis of leprosy was made. The bacillus of Hansen was at this time easily demonstrated in the blood as well as in the tissues. The cutaneous lesions being of less interest to the laryngologist, they are here omitted.

About three years ago the patient underwent some nasal operative treatment, with but slight relief to the local condition, and the treatment for the skin lesions by Dr. Oulmann exercised no permanent benefit. It may be mentioned that nothing was left undone that might have stayed the advance of the disease process, and along with other remedies "nastin," a leptothrix serum, and "salvarsan" were used hypodermatically without any favorable influence. The Wassermann reaction in this case was always strongly positive. Soon a persistent hoarseness developed, and the suspicion that the lepra process had invaded the vocal organs could be corroborated on laryngologic examination. This was two years ago, when the patient first came under my observation; the clinical picture then consisted of crust formations in the nose, with a large perforation of the nasal septum. Numerous nodules covered the remaining septal surfaces as well as the posterior pharyngeal wall. About the border of the epiglottis and arytenoid cartilages there are numerous coalescent nodules as well as some isolated, grayish pearly and glistening in appearance, with a yellowish brown coating. The false cords, especially on the left, are covered with nodules, and both are infiltrated. The left vocal cord is retracted and in a fixed position, otherwise the vocal cords seem to be free from infiltration. The patient has absolute aphonia and is bearly able to whisper, has slight dysphagia, but nowhere are ulcerations to be seen.

As regards the therapy in this case, my report is unfavorable. The usual cauterization treatment and fulguration under cocain anesthesia yielded no apparent result after a fair trial.

In conclusion, it may be pointed out that the form of leprosy from which this patient suffers is not at all contagious, and hence the carrying out of any particular rules for isolation or quarantine is not thought to be necessary.

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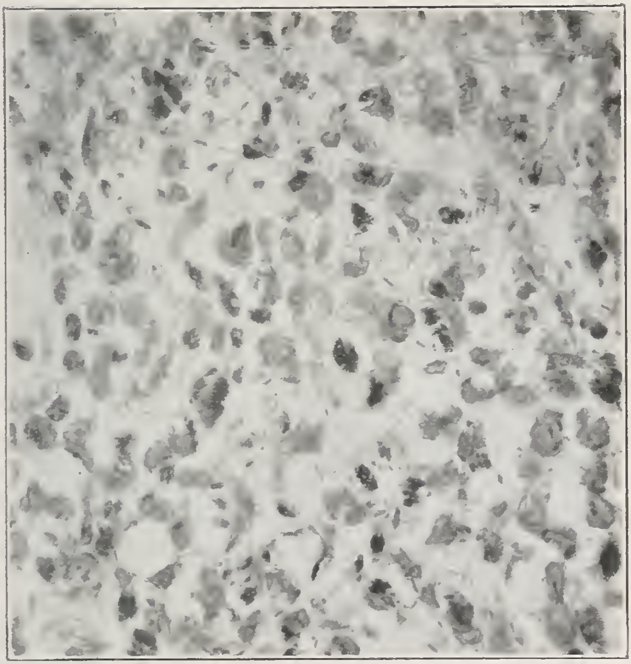

FIGURE I.

Microscopic specimen. Made by Dr. F. B. Humphreys.

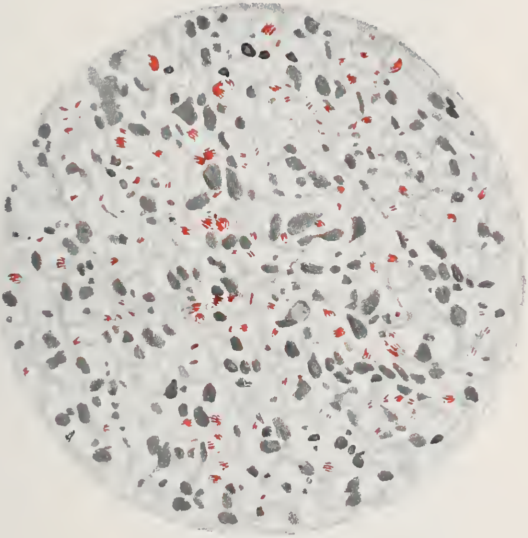

FIGURE II.

Microscopic specimen, showing Hansen's small rod-like leprosy bacilli colored red. Made by Dr. F. B. Humphreys.

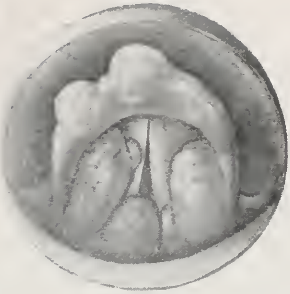

FIGURE III.

Shows the condition of larynx at time of writing.

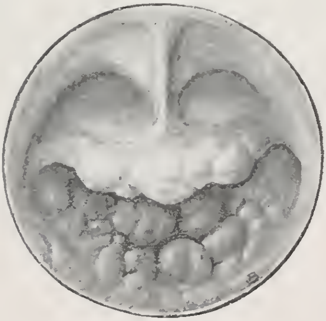

FIGURE IV.

Shows the condition of the laryngeal region about six months after.

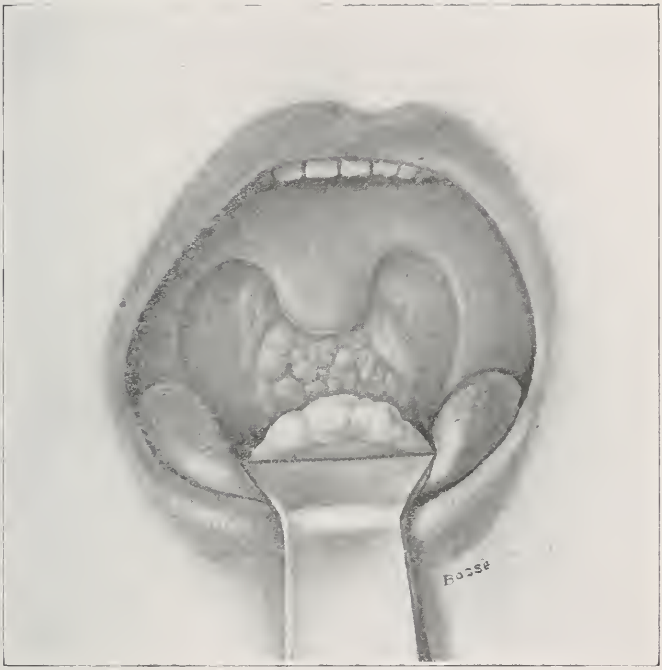

FIGURE V.

Shows the pharynx and upper part of the epiglottis. Recently taken.

LVIII.

THE DYNAMICS OF NASAL DEVELOPMENT—ITS BEARING ON RESECTION OF THE SEPTUM.

By William Wesley Carter, A. M., M. D.,

New York City.

The importance of the nasal septum as a factor in the development of the nose, and the part it plays subsequently as an important integral part of the nasal arch, has been impressed upon me in the course of my work on the deformities of the nose. It is a subject, too, that has been largely neglected, though the importance of its bearing upon the submucous operation is recognized at once. That this function of the septum is real and of great practical importance to the surgeon has been demonstrated to me by the several cases of sunken deformity of the nose, due directly or indirectly to the submucous operation, that have been referred to me for correction during the past few years. Such results are to a large extent avoidable, and I believe that a thorough understanding of the forces employed by nature in the development of the flattened nose of the infant into the prominent, shapely organ of the adult, will contribute largely to the prevention of such deplorable accidents which reflect undeserved discredit upon one of the most artistic and useful operations in rhinology. In no operation do manual dexterity and experience count for more, and in no procedure do uniformly excellent results testify more eloquently to the skill of the surgeon.

When we consider the various forces that enter into the development of the nose, we cannot but marvel that the task imposed upon nature should ever result in the development of a symmetrical organ and one bearing a correct proportion to its facial environment.

Each side of the nose constitutes practically a dynamic entity, and yet these two systems must develop uniformly and almost independently side by side to produce a single organ, upon the perfect, symmetrical development of which the comeliness of its possessor depends to a far greater extent than to any other factor.

Owing to the fact that the nose is a protuberance, springing from a more or less flat surface, and receiving its support, its impulse of growth and expansion from its base only, the poise of its constituent parts is all the more delicate and sensitive to disturbing influences.

The scope of this paper is not intended to include embryology, suffice it, therefore, to remind you that in the early fetus there is only one nasal cavity, and this does not exist as a separate chamber, but opens directly into the mouth. The division of this by the septum nasi commences before its separation from the mouth is effected by the palatal processes of the superior maxillæ and the horizontal plates of the palate bones. The fusion in the middle line of these three segments —i. e., the two palatal processes and the vomer—begins forward at about the eighth week and proceeds backward, and is completed about the tenth week. At this tripartite suture, if the union between the palatal processes is delayed or insecure, or if the lower edge of the vomer reaches this point of junction first, it may push down into the roof of the mouth and cause the ridge of bone frequently noticed in the midline of the hard palate. This ridge may also be caused later in life by the vertical pressure to which the septum is subjected during the formative period of the nose. The development of the flat infantile nose into the adult type is effected chiefly by forces acting from three separate and distinct sources— the two nasal processes of the superior maxillæ and the septum. To a disproportion in the action of these three forces is due the variations in the shape and contour of the nose which constitute socalled family and racial characteristics. To this may also be attributed the nontraumatic nasal deformities. The latter may be caused also by the unequal development of the two sides of the nose, especially the two primitive plates from which the vomer is developed.

Deflections of the septum at birth are unknown—in fact, they are almost never seen until the forces which take part in the development of the nose become active, which is between the fifth and seventh years. From this time on until puberty there is every evidence of the activity of these forces. The most active period of all is during the second dentition, when the growth of the upper jaw is very active. At this time most of the nontraumatic deviations of the septum occur, for the septum is under considerable vertical tension, and the slightest force, such as the insertion of the finger into the nostril, may throw the septum out of the vertical, and being unable to recover its normal position, an obstructing deflection in time results.

Normal symmetrical development may be interfered with by many causes, but the most frequent is adenoids, which cause the upper jaw to be undersized and the arch of the palate to be raised. Under these circumstances the vertical space is too short to accommodate the normal increase in the length of the septum, and a deflection results.

The septum, which we will assume is the chief factor in the development of the nasal prominence, is locked in by the bony walls of the nasal cavity. Its vertical growth is opposed below by the arch of the hard palate, and above not only is it opposed, but it is being constantly encroached upon by the downward expansion of the base of the skull, due to the rapid growth of the child's brain; this influence is more pronounced in the highly civilized races, and corresponds exactly with our findings in regard to the frequency of septal deviations. These never occur in the lower animals, and they are extremely rare in the Mongolian and African races. Personally I have never seen a nontraumatic deviated septum in a negro, and the experience of several men with whom I have corresponded in regard to this matter, who have large practices in the South, corresponds with my own. In these races the nose is broad and flat, and the septum, in addition to being comparatively free from the encroachment of the brain box, does not seem to have, as in the Anglo-Saxon, the inherent power of growth necessary to raise the bridge of the nose. Certainly it is practically immune to those influences which, according to McKenzie and others, produce deviated septa in seventy-seven per cent of the Anglo-Saxon race.

The ossification of the various bones that enter into the formation of the nose begins at or about the same time—the sixth or seventh week of fetal life. The vomer, however, does not begin to ossify until the eighth week. This may add somewhat to the disadvantage which its anatomic position imposes upon it, but the relative time at which ossification occurs in these bones does not aid us materially in our consideration of this subject, and we will turn, therefore, to the structure and position of some of the more important bones and to the general architectural construction of the nose.

In the opinion of the writer the septum has a most important function in the development of the nasal prominence. Its upper edge, where it lies between the lateral cartilages and between the nasal bones, constitutes the keystone of the nasal arch. But its chief function is that of raising the bridge of the nose, and this I believe is accomplished mainly by the vomer. I will, therefore, consider this bone more in detail. The vomer is placed like a wedge securely between the body of the sphenoid and the arch of the hard palate. Its anterior border forms an inclined plane, the apex of which reaches as far forward as the incisor crest. Its position is very secure, and it is well adapted to serve as a basis from which the force which develops the nose may spring. Furthermore, the anterior border of the vomer is parallel with the prospective contour of the nose. The growing vomer, therefore, acts at right angles upon the vertical plate of the ethmoid and the septal cartilage, and the growth of the latter in a downward and backward direction is well resisted by the vomer. The division of the original nasal cavity is effected by the vomerine cartilage; the anterior part of this remains as the septal cartilage, but the posterior part does not become the vomer. Ossification in the vomer does not occur in cartilage, but it begins in two ossific centers situated in the lower, back part of the membrane which covers the vomerine cartilage on either side. From these centers, which make their appearance about the end of the second month, ossification proceeds forward and upward. The fusion of these two lamellæ occurs behind and below about the third month, and their fusion gradually extends forward, absorbing and to a certain extent pushing forward the central cartilage and the vertical plate of the ethmoid. This process continues until puberty; at this time the laminæ of the vomer have become completely united, and all that remains of the original cleft is the groove on its anterior surface in which is lodged the septal cartilage. The manner in which this cleft is closed, beginning posteriorly and gradually extending forward, and this process continuing during the years of active nasal development, shows conclusively the importance of the vomer in the dynamics of the nose. On the other hand, if through disease such as syphilis or atrophic rhinitis the vomer is destroyed, or if its development is interfered with in early life, a saddle-back deformity, more or less pronounced, develops.

My studies have been conducted more with a view to solving the dynamics of the septum than of any other part of the nose, because of its practical bearing on the submucous operation and the influence which it has in the production of nasal deformities.

I have concluded, first, the normal position of the upper edge of the septum, which constitutes the keystone, is necessary in order to maintain the integrity of the nasal arch. In removing the septum, therefore, no instrument should be used that necessitates tugging, for if this upper edge of the septum is removed or displaced, a depressed deformity will result, which can be corrected only by the transplantation of bone. As I first suggested several years ago, a punch forceps is the best instrument for removing the septum. This not only requires no tugging, but it has the additional advantage of enabling one to remove the exact amount of tissue necessary to relieve the obstruction. I have concluded, further, that the lifting force exerted by the septum is indispensable to the development of a symmetrical nose, and therefore it cannot be extensively removed with safety during the years of active nasal development. Fourteen years of age I regard as the limit of safety. On the other hand, the framework of the nose, conforming as it does to the definition of the arch, does not require any external support other than at its two extremities. Therefore, the septum, if properly removed after the nose has acquired the correct proportions of adult life, causes no injury from an esthetic point of view, and the architectural strength of the nasal arch remains unimpaired.

LIX.

REPORT OF CASES OF AURAL INFECTION WITH THE STREPTOCOCCUS CAPSULATUS.

By Charles E. Perkins, M. D.,

New York.

I desire to report briefly a few cases of aural infection with the streptococcus capsulatus, or bacillus mucosus, which illustrate some of the forms that infection with this germ may assume.

Case 1.—An instance of an apparently severe form of infection which cleared up by free drainage through the drum membrane.

M. E., aged thirty-three years, came under my care April 14, 1912. One week previously, while bathing in a pool, he was nearly drowned and was resuscitated with some difficulty. This was a common pool, about ten feet square, and one may presuppose the presence of germs in abundance. On the following day he had pain in the left ear, which became severe and was followed in a few days by pain behind the ear.

On examination he had marked tenderness; the drum membrane was bulging, thickened, and without luster. A free incision was made. During the next two days the discharge was profuse and the mastoid tenderness diminished, but pain in the opposite ear developed, with bulging membrane. This was freely incised under gas, and as the first ear was not draining properly, it was reincised. Four days later, reincision of the right, or second ear involved, became necessary, as it was not draining satisfactorily—as shown by inspection of canal, increase of mastoid tenderness, and the presence of some spontaneous pain. After this the case progressed satisfactorily, and the patient was discharged on the eighth day. I saw him, however, at times during the following three weeks, when recovery seemed complete. I have lately examined this patient, after two years, and he has remained well.

During the last three years there have been quite a number of patients with this infection in Dr. Dench's clinic at the New York Eye and Ear Infirmary that I have treated and that have cleared up without operation. In some no special mastoid symptoms have been present at any time. Simply being suspicious of the character of the discharge, I have had a smear examined and having found the prevailing germ to be the streptococcus capsulatus, I have kept them under close observation and they have cleared up without mastoid symptoms. Some of them I have seen for two or three months, and am satisfied that their recovery was complete. I regret that I cannot give X-ray findings in these cases, but most of them occurred before we were accustomed to place as much reliance in X-ray plates as we do now. I have seen a number of cases of mastoid involvement which at no time were accompanied with aural discharge.

Case 2.—S. L., female, aged twenty-five years, referred by her physician on July 27, 1909. For three months had a small swelling behind the left ear, which appeared just subsequent to confinement. Examination showed a hard fluctuating mass behind and above the ear, about an inch in diameter. The auricle seemed to stand away from the head. The external auditory canal, the membrana tympani and fundus appeared absolutely normal. I advised postauricular exploration, and at the infirmary I operated on the following day and found the mastoid completely broken down, a large perisinus abscess, and a large quantity of pus. The tympanic vault was completely walled off by firmly organized tissue, which I did not disturb. Examination of the pus showed infection to be streptococcus capsulatus. The patient made a perfect recovery. At no time was there the slightest discharge from the canal. The wound was completely healed in five weeks.

Case 3.—Mrs. E., aged sixty-two years, consulted me on September 18, 1913. Began with pain in left ear, following a cold in preceding March, i. e., six months previously, during which time she had suffered more or less pain in the ear and head. She was treated by the family physician in all manner of ways except by incision of drum.

Examination showed some loss of luster and thickening of the membrana tympani, and also slight narrowing of the canal, with mastoid tenderness and thickening of postauricular tissues. Two and one-half per cent of sugar in urine; no acetone.

X-ray examination by Dr. Dixon: Large pneumatic type; septa between cells blurred. Frankly an operative case.

On account of the marked glycosuria, operation was done as rapidly as possible—total time, twenty-three minutes. The mastoid was found to be totally disorganized. Large perisinus abscess, with immense granulations springing from its walls; pus, abundant, showed infection to be streptococcus capsulatus. Wound healed in six weeks; remains well.

Case 4.—M. H., age sixty-five years; referred by his physician (on December 20, 1913), who had treated him for about four weeks for tinnitus and impaired hearing in the left ear. There was no pain or mastoid tenderness, but the drum was thickened and without luster. Inflation produced moist râles.

X-ray by Dr. Dixon: Right, clear pneumatic mastoid; left, same type, but cloudy throughout.

It was not until a week later that tenderness about one inch posterior to the ear developed and he began to have pain at night, then he consented to operation, which showed the mastoid to be disorganized and filled with a large granulating mass springing from the sinus. Large tip cells filled with pus, and an epidural abscess extending fully an inch posterior to the sinus in the cerebellar fossa. Convalescence uneventful; wound healed in five and a half weeks.

Case 5.—Mrs. M. S., age sixty-five years, consulted me on March 2, 1914, with a history of pain in the left ear for seven weeks. Four weeks previously, incision of membrane by a very competent man, followed by no discharge of pus. The mastoid was tender and the overlying tissues were somewhat edematous. The drum membrane was thickened and lusterless. There was no discharge from the canal. The operation showed the mastoid cells to be disorganized, with epidural abscess at sinus knee. Convalescence slow.

The following case is one of many observed in which the discharge was profuse, the bacteriologic examination leading, in a way, to the operation:

Case 6.—A. G., male, age fifty-eight years, came under my care February 12, 1914. Pain in right ear for two weeks. He was treated by his physician, but without incision of the drum. He had marked mastoid tenderness. The membrane, which was thickened, dull red, and lusterless, was incised. The following week the mastoid tenderness became very much less—indeed, nearly absent. The discharge, however, continued profuse.

X-ray by Dr. Dixon showed large celled pneumatic bone, cloudy throughout. Operation showed mastoid thoroughly infiltrated with pus. The wound healed in seven weeks.

The following case was one in which the ear infection seemed very benign:

Case 7.—Mr. S., age forty-five years, has had discharge from right ear for past two winters, lasting each time about one week. About the 1st of January, 1914, he developed an acute inflammation of the middle ear with spontaneous rupture of the membrane, which was incised two days later. The discharge was not profuse at any time. My impression is that I had a smear made and that it showed some benign infection, but I am unable to verify this, as the records are silent on this point. At any rate, the discharge had none of the characteristics which we are accustomed to associate with that due to streptococcus capsulatus. There developed marked spontaneous pain and tenderness in the occipital and preauricular regions; but, as there was no mastoid tenderness and the patient was a very nervous individual, this was attributed to neuralgia and hyperesthesia. Nevertheless, on January 16th, an X-ray was made by Dr. Dixon: "Left mastoid seems diploic; right (involved side), indistinct pneumatic; has appearance of sclerosed bone." One would hardly operate on this X-ray finding alone.

During February the discharge ceased, although inflation always showed fluid in the middle ear, and the membrana tympani remained dull and lusterless. Early in March a moderate sagging of the superior wall occurred, extending from Shrapnell's membrane outwards, about one-third the length of the canal. The pain and tenderness in the occipital and preauricular regions had become very slight, but a tender spot had developed about an inch posterior to the ear.

X-ray examination by Dr. Dixon showed (March 13th): Right mastoid, cloudy. Perisinus abscess has developed since January 16th (date of former examination).

(Note.—The beginning of the abscess was shown on former plate, but at that time was so small that it escaped notice.)

Operation on March 20th. Cortex, sclerosed, but after it was removed pus welled up and perisinus abscess was found. In this location—one inch posterior to ear—site of tender spot and abscess shown in X-ray plate, the bone was eroded nearly to the surface by a large granulation springing from the sinus. The patient made an uneventful recovery. The mastoid healed completely in four and a half weeks.

That one is not through with these cases at times, even when an operation has been performed and convalescence is apparently well established, is illustrated by the following case, occurring in the practice of Dr. N. R. Dann, to whose kindness I am indebted for the report:

Case 8.—W. K., age thirty-eight years, seen on December 4, 1913, in consultation with family physician. Aural suppuration for three weeks. Examination showed profuse aural discharge, decided sagging of canal wall, and extreme mastoid tenderness. Operation same day. Two cortical perforations; pneumatic bone infiltrated with pus; sinus exposed. Wound practically healed on March 15th, over three months later, a small sinus, however, persisting. On March 25th, Dr. Dann saw the patient in consultation. He had suddenly gone into collapse. He had had severe headache for three days and nights previously, and had had severe vomiting. Temperature 102.4°. Patient unconscious and picking at the bedclothes. Pupils unequal and do not react to light. Kernig marked. No lumbar puncture; no autopsy.

I think we are justified in concluding:

1. That this germ has a special affinity for bone tissue.

2. That in these aural infections, if the passage between the middle ear and the mastoid is large, drainage through the ear may effect a cure; so the importance of early and free incision of the drum membrane cannot be overestimated.

3. That the X-ray examination is of great help in these cases.

4. That an early and free operation is indicated as soon as we are convinced of irreparable mastoid involvement.

5. That these cases, whether operated or not, should be watched closely throughout, as late complications are more frequent, perhaps, than in other infections.

6. It would seem that patients advanced in life, and diabetics, are more liable to this infection than to other forms.

LX.

HISTOLOGIC PATHOLOGY OF THE NOSE.*

By Joseph C. Beck, M. D.,

Chicago.

In presenting this paper I wish to call attention to the paper I presented before this Section on "Histologic Pathology of the Accessory Sinuses" last year, which appeared in the Transactions, as well as in the Annals of Otology, Rhinology and Laryngology, December, 1913. The subject of this paper would be incomplete without considering the material already presented, since the accessory sinuses must be considered as part of the nose. However, in view of what has been published, I will confine myself to the pathology of the septum, inferior turbinated body, and organized exudates. The various changes that I have observed histologically are not always clearly demonstrable grossly, and, therefore, the importance of the microscope is essential in bringing out the pathologic changes in detail insofar as they may be applied to diagnosis, prognosis, course, and treatment.

I.—SEPTUM.

Figs. I to VII. From these sections one can very easily conclude that there is a definite change in the bone, in the presence of great rarefaction. The spaces are filled with the spongy material, not unlike that shown first by Siebenmann in the early stages of otosclerosis or spongification. The cartilage shows great activity at the junction of these spongifying changes in the bone. Similar changes have also been found in various other diseases, as acromegaly, osteomalacia, arthritis deformans, and physiologically in pregnancy in the first months. I have further demonstrated these same changes, early in the disease, in the middle turbinated body and ethmoid cells in hyperplastic ethmoiditis and atrophic rhinitis. The later secondary changes are usually fibroses or scleroses in the bone and degenerative processes in the soft structures covering the bone. In my paper on "Histologic Pathology of the Accessory Sinuses," I advanced a theory, based on these pathologic changes, that the etiology of hyperplastic ethmoiditis and atrophic rhinitis, was possibly a disturbed function of the glands of internal secretion. This same theory or suggestion is again offered as to the cause of ridges and spurs in connection with the overgrowth of the septum and consequent deviation. Which gland or combination of glands is involved it is not possible to say at this time.

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*Read before the American Laryngological, Rhinological and Otological Association, Atlantic City, June, 1914.

Cases of abscess of the septum which required subsequent resection to correct deformity show the loss of the cartilage cells with the formation of connective tissue, especially of the subperichondrial region and in the absorbed cartilage. (Fig. VIII.) The hyaline degeneration is seen in the homogeneous appearance. (Fig. IX.)

The bilateral thickening of the septal cartilage, otherwise spoken of as the tuberculum septi, is shown in Fig. X. There appears to be a great deal of activity in the cartilage cells, and the part just below the perichondrium, which the writer calls subperichondrium, appears very much thickened.

In connection with the filling out of a septum by means of paraffin in atrophic rhinitis the writer has chipped out a piece of cartilage with mucous membrane attached on one side, and in the several cases it shows, as in Fig. XI, that the epithelium is keratetic and thin, but the subepithelial structure and the perichondrium are thickened. The cartilage is unchanged A statement made in textbooks as to the absence of blood vessels in cartilage appears not to be true, according to the specimen, shown in Figs. XII, XIII and XIV, in a case of cartilaginous deflection.

II.—INFERIOR TURBINATED BODY.

In regard to the inferior turbinated body we see the manifold changes in the soft tissues covering the bone. The latter (bone) is seldom changed. Occasionally in marked suppurative sinus disease there is an osteitis, but usually the changes are confined to the soft structures. These macroscopically appear about the same, but histologically are quite different. The hypertrophy may be of the connective tissue, mucous glands, vascular, epithelial and bone. They may be and in fact are usually combined. The majority of specimens show the connective tissue predominating, and the glands and vessels are frequently destroyed by its pressure action. The epithelium is very much hypertrophied, especially in connection with chronic suppurative sinusitis. It is at times folded in and shows under the microscope like lakes or channels. (Figs. XVI and XVII.) Also some of these epithelial folds undergo hornification or degeneration. (Fig. XVIII.) The papillary changes of the posterior ends are principally made up of connective tissue covered with thick layers of epithelium. (Figs. XIX-XX.) These are spoken of as posterior hypertrophies or mulberry enlargements.

In the chronic intumescence of the inferior turbinate the connective tissue usually predominates; it is somewhat edematous and shows many blood vessels, especially of the newly formed type. The epithelium is frequently infiltrated with round cells. (Figs. XXI-XXII.)

In the study of atrophic rhinitis the writer removed a small particle of the inferior turbinated body and found that the change is not the same on both sides of the turbinate, as shown in Fig. XXIII. The mucous glands appear to lose their function by distention rather than by connective tissue contraction, as shown in both Figs. XXIII and XXIV.

I have observed that these various changes of the inferior turbinated body respond differently to various kinds of treatment, and that is the essential point in the study of these specimens. One therefore can prognosticate as to the recurrence after resection, crushing and cautery. The treatment that I most frequently employ, except in very large posterior ends, is the crushing of the lower edge by means of author's conchotribe (Fig. XXV), because it is applicable to the various pathologic changes mentioned above without destroying too much functionating tissue. I have made sections of these hypertrophies of the inferior turbinated body so crushed, and have found on the third day, at the height of the reaction (Fig. XXVI), marked round cell infiltration and areas of necrobiosis. Removing another piece on the tenth day, I found the tissue practically all shrunken and very little evidence of organized tissue. (Fig. XXVII.) The result was correspondingly good as to breathing and drainage.

Syphilitic changes of the later stage are manifest as granulation, exudates and sequestra. The granulations and sequestra show microscopically the same picture as luetic granulation and sequestra anywhere else in the body, but the exudates lack the round cell infiltration found in luetic exudates elsewhere.

Sarcoma and carcinoma found in the inferior turbinated body are usually secondary to sarcoma of the nasopharynx and carcinoma of the superior maxilla (epulis).

The characteristic histologic findings of carcinoma and sarcoma are the same as anywhere else in the body.

Tuberculosis of the inferior turbinated body is very rare, and the one case the writer had and reported in Ballenger's textbook, page 304, showed the characteristics of giant cells.

True myxoma or polypi of inferior turbinate is also very rare, and the one specimen shown here (Fig. XXIX) is an evidence of the misinterpretation of the structure macroscopically. The inflammatory edema of the anterior or posterior end is usually mistaken for a true myxomatous polyp.

EXUDATES.

Almost every one has observed fibrinous casts after cautery. operations and infections. The histologic study of these are of considerable interest and importance, as shown in the illustrations. (Figs. XXX, XXXI, XXXII, XXXIII, and XXXIV.) I have been able to show that an exudate after electric cautery differs histologically as to the variety of the pathologic change in the inferior turbinate; i. e., the exudate is very much firmer and more fibrinous in the glandular hypertrophy than that of the connective tissue hypertrophy, and still greater than when the vascular tissue (turgescence) predominates. In this later condition there is frequently a recurrence of the exudate after it has disappeared, only not so marked. Macroscopically these exudates also differ in color and consistency.

The cause of exudates forming after operation is not known, but I have seen them in groups and have thought that it might be due to some chemical change in the cocain solution, or to a mould formation within the solution. I have never found batceria within them to any extent. During the time when I was experimenting with bismuth paste dressing after operation, I noted that fibrinous exudate infiltrated with bismuth were not at all uncommon.

The leucocyte infiltration is of particular note, often predominating over the round cells. I have found that in these cases where local applications, such as argyrol, were made, the exudate continued for a longer time than under other conditions. If it was removed mechanically it would reform very quickly.

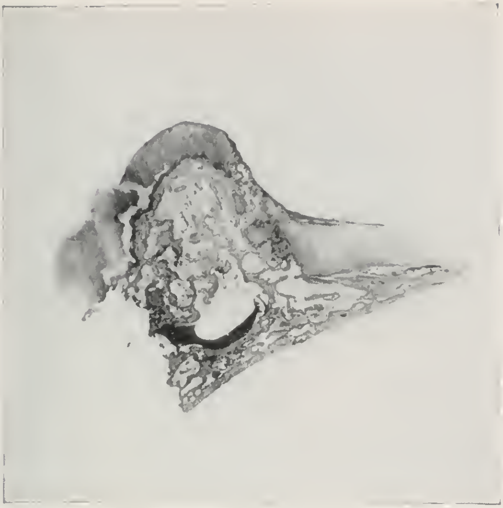


FIGURE I.

Submucous resection of the septal ridge. Rarefaction of bone. Great activity of bone and cartilage at their junction.

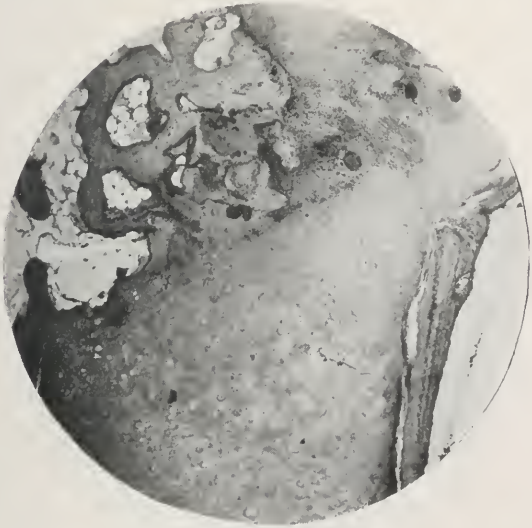


FIGURE II.

Septal deviation. Ridge removed submucously, showing great cartilage and bone activity at their junction. Rarefaction clearly demonstrable.

Same as Figure I, higher power.

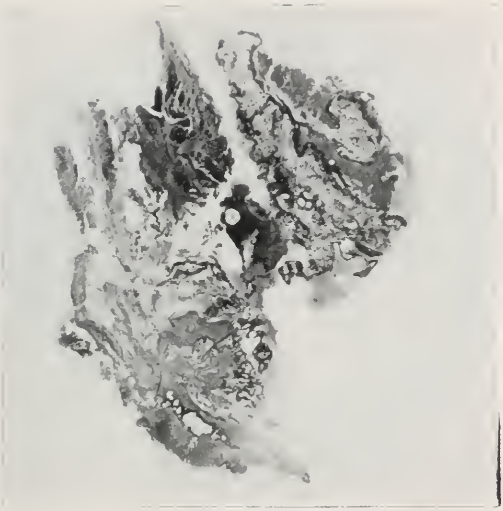


FIGURE III.

Ridge of the septum. Removed submucously. Showing marked rarefaction of the bone.

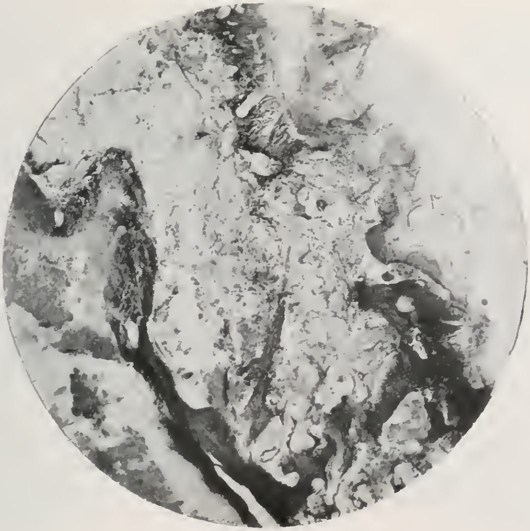


FIGURE IV.

Septal spur posterior portion near the sphenoid. Removed submucously. Showing great rarefaction in the bone with osteoclastic changes and interosseous substance filled with osteoblasts.

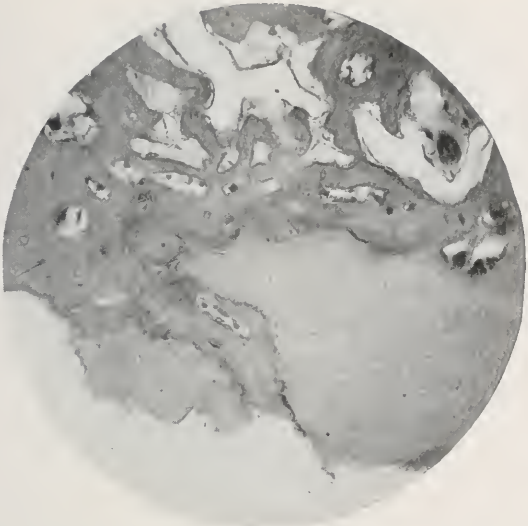


FIGURE V.

Ridge of bone removed submucously. Showing junction of cartilage and bone. Great activity at these points, with bony rarefaction.

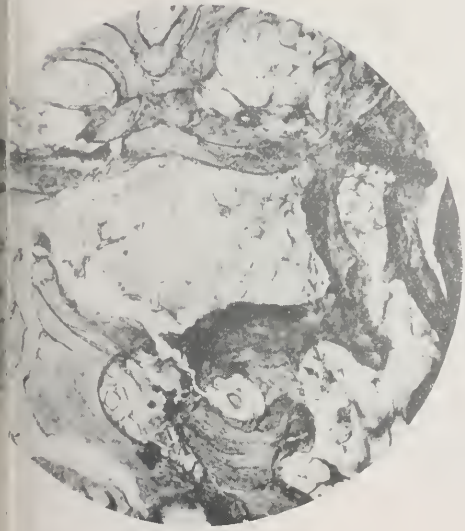


FIGURE VI.

a e ridge from the premaxilla, showing
kl rarefaction.

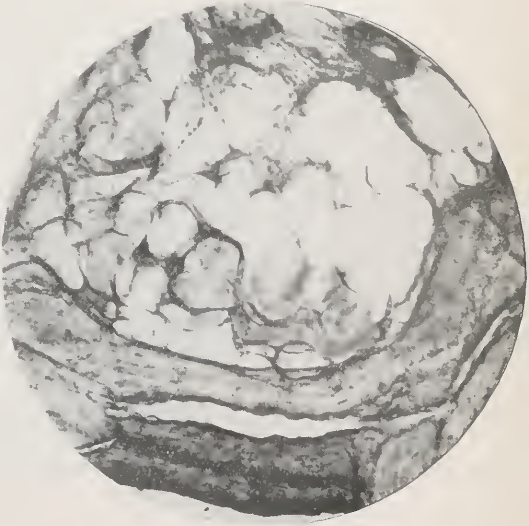


FIGURE VII.

Same specimen as Figure VI, higher power. Shows great deal of fat formation in the marrow.

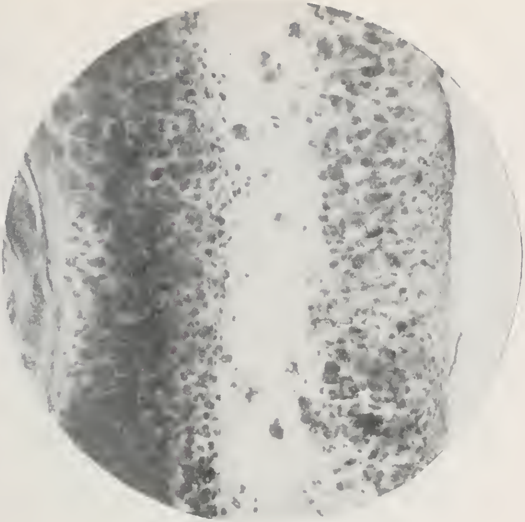


FIGURE VIII.

Abscess of the septum. Septum resected for deflection, following traumatic hematoma. Shows cartilage cells markedly infiltrated with round cells. Center of cartilage is homogeneous, and cartilage shows leucocytic infiltration.

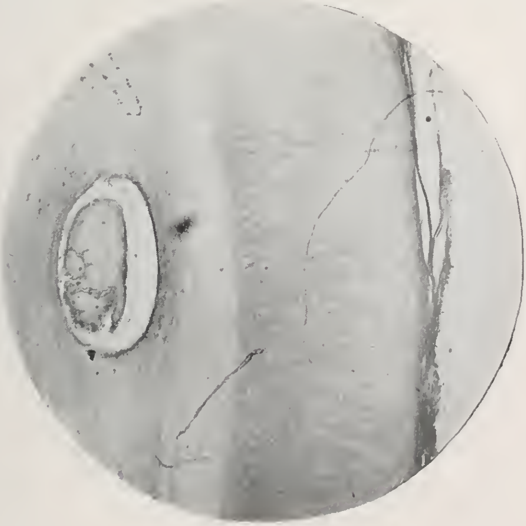


FIGURE IX.

Resected cartilage in a traumatic foot-ball nose. Caused primarily by abscess of the septum. Perichondrium very much thickened with large veins; organized blood within it. Cartilage cells in many places shriveled. Opposite side of perichondrium normal.

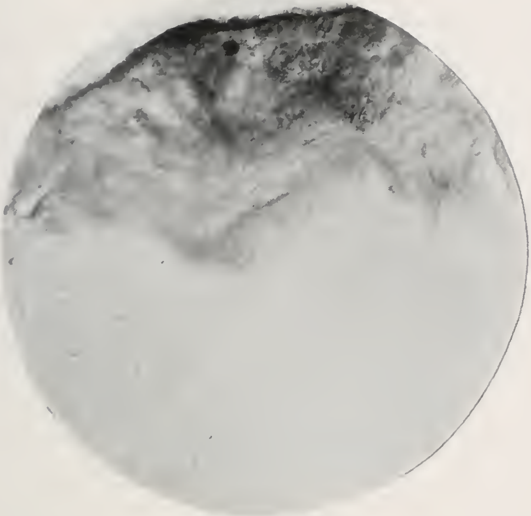


FIGURE X.

Deviation of the septum. Cartilage high up anteriorly. Young individual. Showing marked thickening of the subperichondrium with great karyoketic figures in the cartilaginous cells at that point.

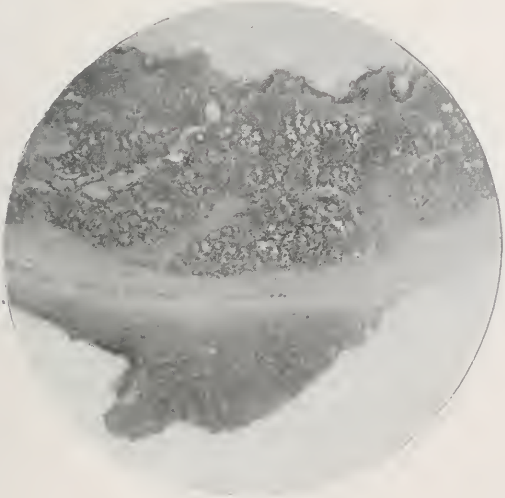


FIGURE XI.

Sliver of septum in atrophic rhinitis (removed experimentally). Mucous membrane hyperplastic, especially the glands. Very thick perichondrium; epithelium thinner.

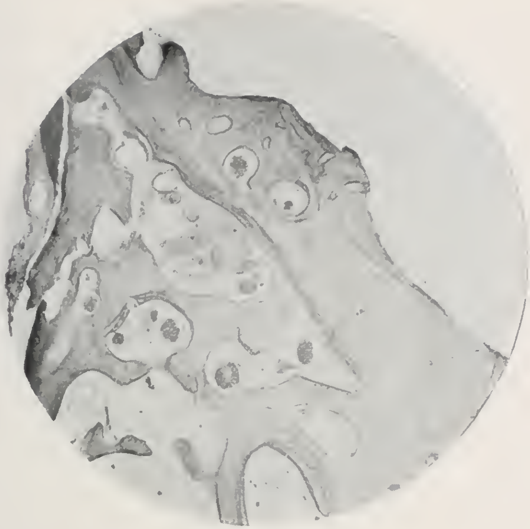


FIGURE XII.

Septal ridge showing at the junction of the bone and cartilage large blood vessel filled with blood. One of these vessels passes into the cartilage.

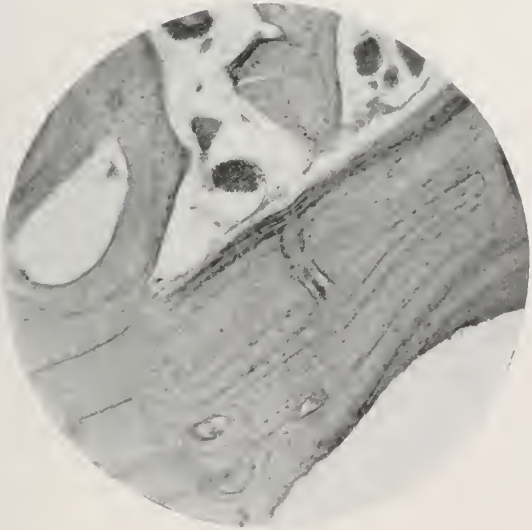


FIGURE XIII.

Same as Figure XII, higher power.

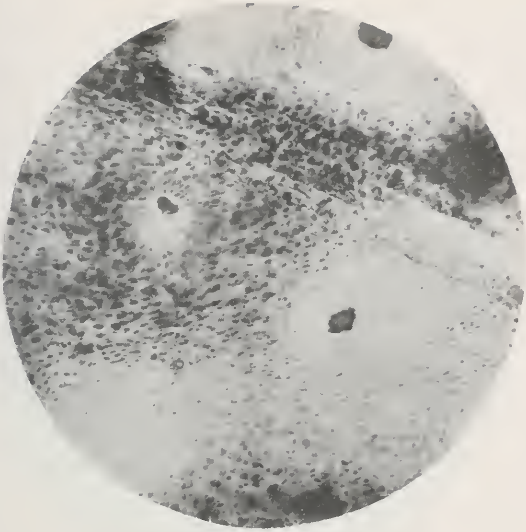


FIGURE XIV.

Septal cartilage showing a great round celled infiltration in the cartilage, and great activity of the cartilage cells themselves. Also cross-section of blood vessels.

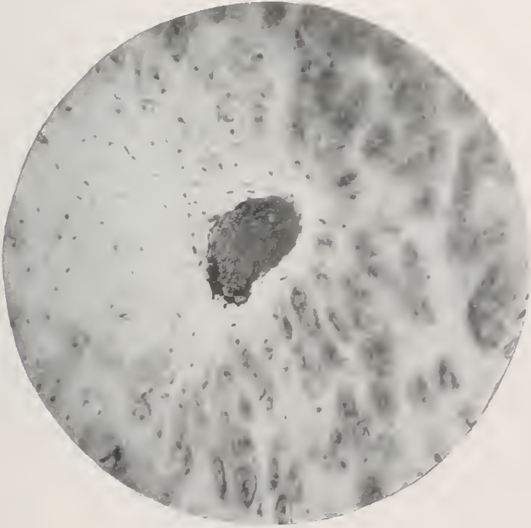


FIGURE XV.

Same as Figure XIV, higher power. Blood vessel filled with blood.

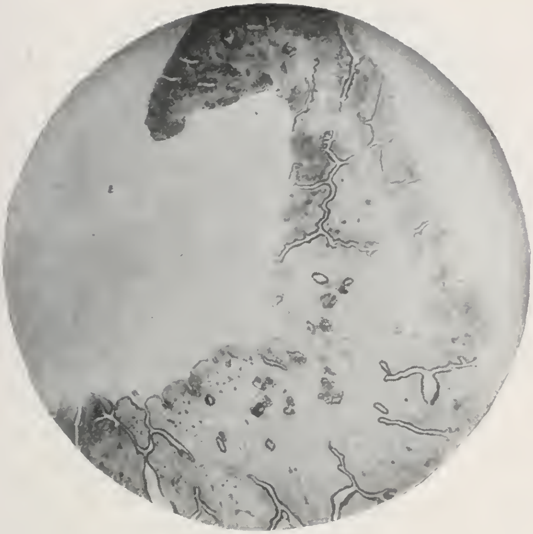


FIGURE XVI.

Hypertrophy of the inferior turbinate body. Mucous membrane showing great epithelial hypertrophy with folded-in masses.

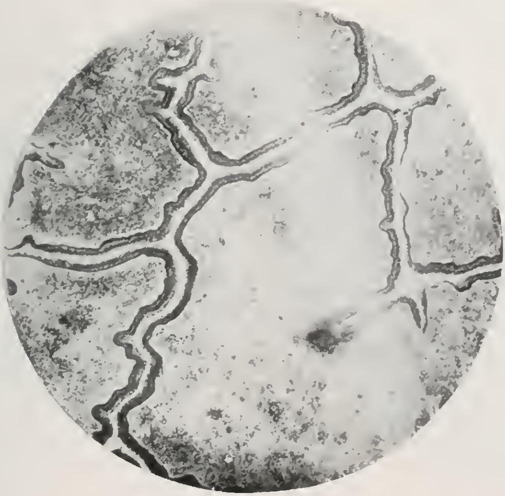


FIGURE XVII.

Same as Figure XVI, under higher power. Showing epithelial lakes.

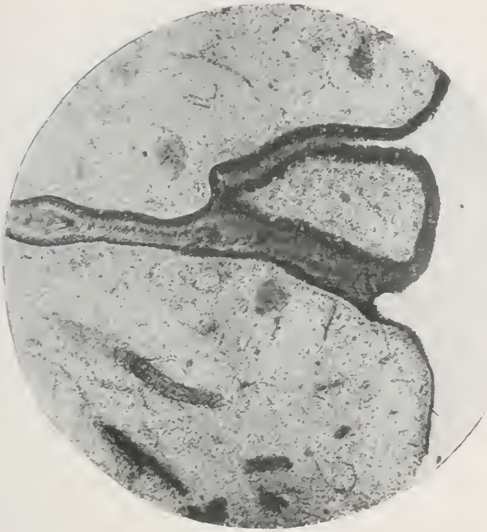


FIGURE XVIII.

Hypertrophy of the inferior turbinate body. Inflammatory edema. Marked thickening of the epithelium with folded-in masses. Showing keratosis.

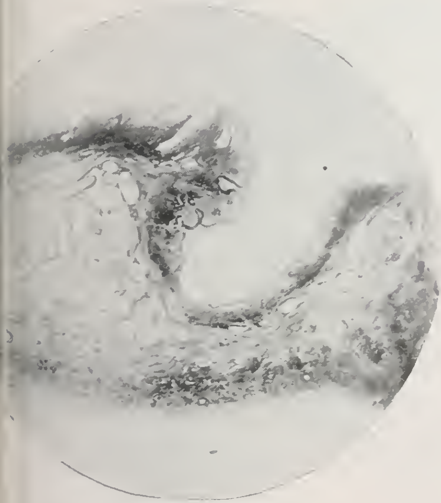


FIGURE XIX.

Papillary hypertrophy of the inferior turbiate body, showing bone and caltilage hyperophied, with considerable rarefaction.

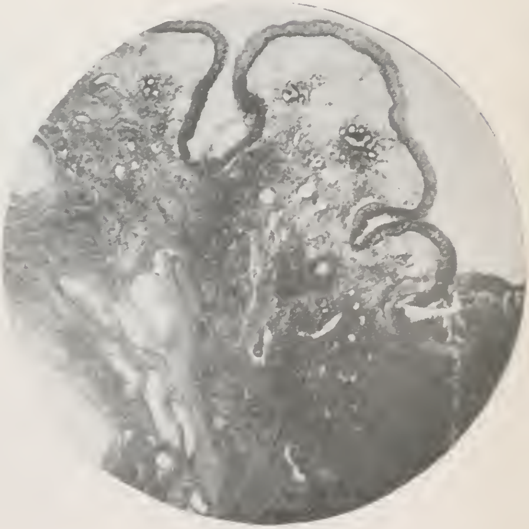


FIGURE XX.

Same as Figure XIX. Very marked thickening of the epithelium of the papilla.

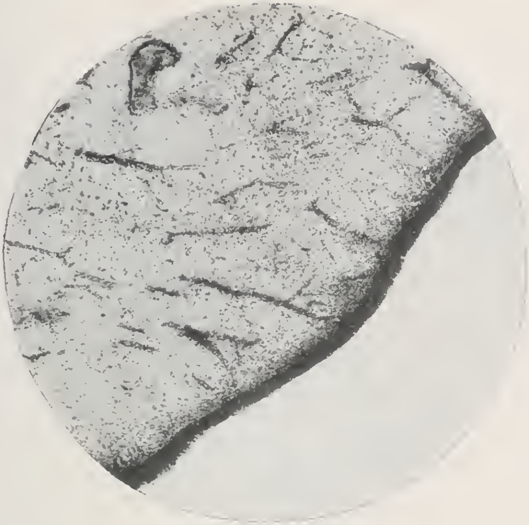


FIGURE XXI.

Chronic intumescence of the inferior turbinate body. Marked inflammation of the surface epithelium. New blood vessels. Almost complete atrophy of all the glands.

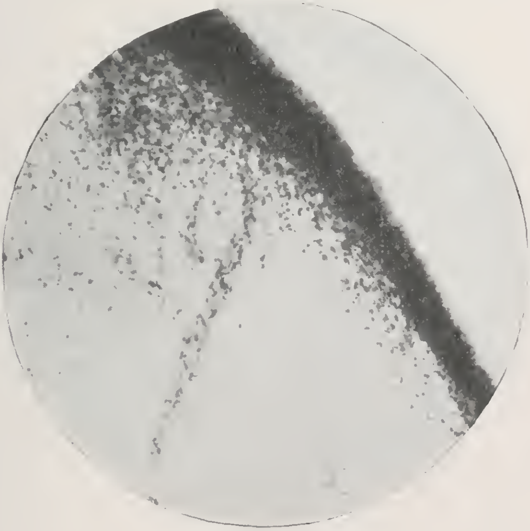


FIGURE XXII.

Same as Figure XXI, only higher power.

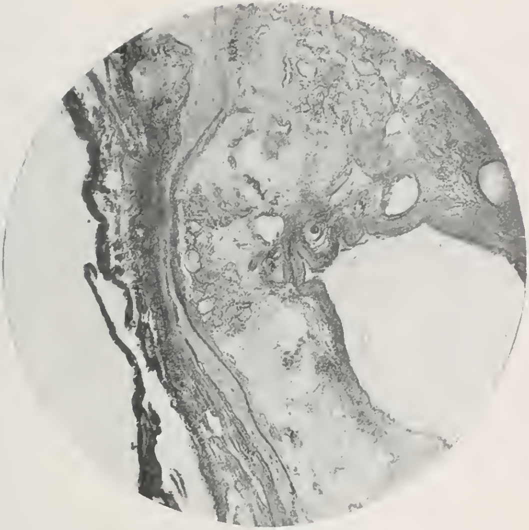


FIGURE XXIII.

Inferior turbinate in atrophic rhinitis (chip removed experimentally). Showing metoplasia of epithelium of the median side and thickening of the antral side. Mucous glands are still present, although distended.

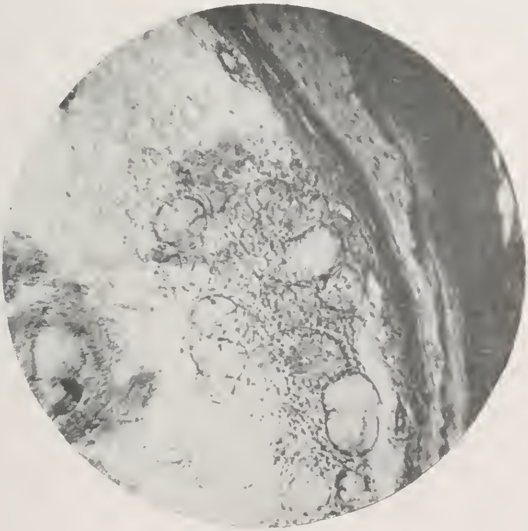


FIGURE XXIV.

Same as Figure XXIII under higher power. Shows gland distended. The bone appears normal in structure.

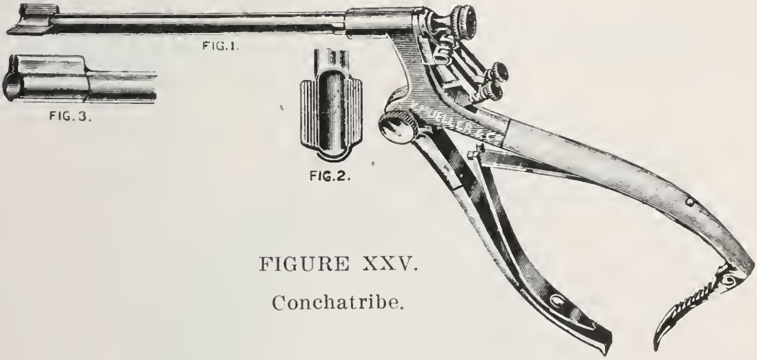


FIGURE XXV.

Conchatribe.

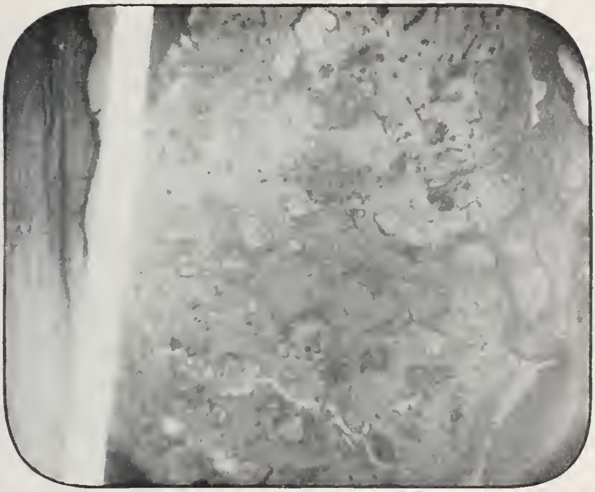


FIGURE XXVI.

Crushing of hypertrophied inferior turbinate (conchatribe). Removed on third day. Showing: (1) Marked round cell infiltration. (2) Areas of necrobiosis.

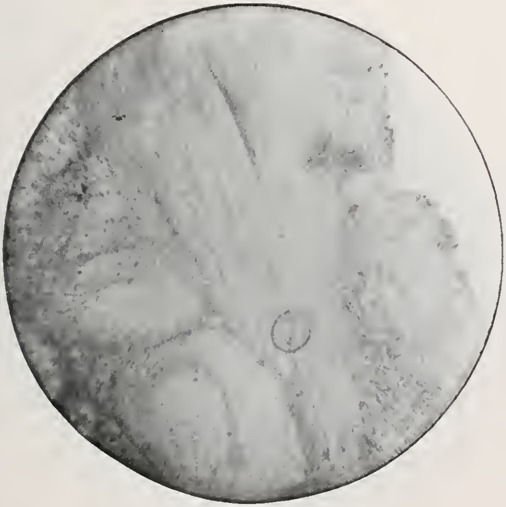


FIGURE XXVII.

Same case as Figure XXVI. Removed on tenth day. Showing tissue practically all shrunken and little evidence of organized tissue.

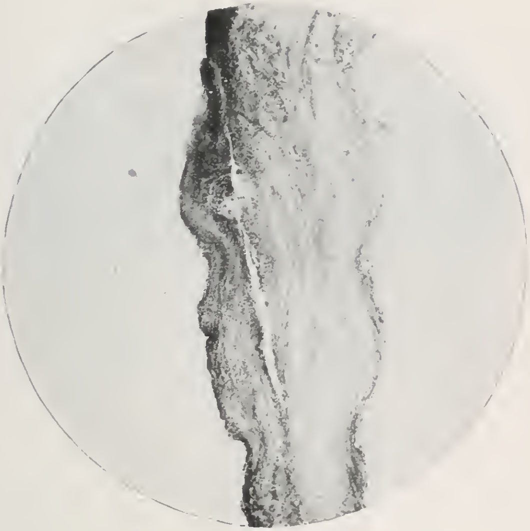


FIGURE XXVIII.

Luetic exudate, principally fibrin. Very few leucocytes and round cells.

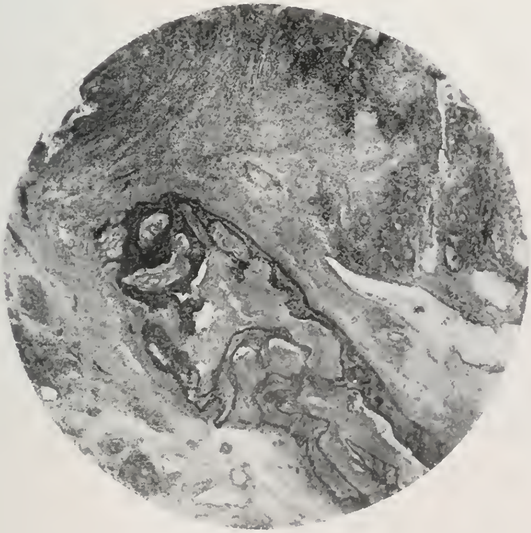


FIGURE XXIX.

Apparently true myxomatous polyp of the inferior turbinate. Rarefaction of the bone; inflammatory edema of the soft parts.

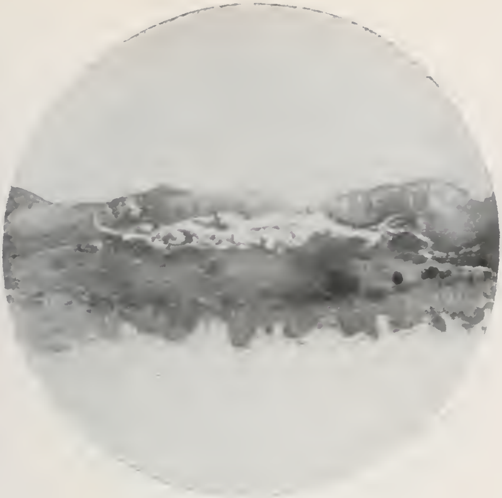


FIGURE XXX.

Eschar following cauterization of the inferior turbinate. Showing marked leucocytic infiltration arranged in small masses on the margin. The pathologic change of the turbinate was chronic interstitial hypertrophy.

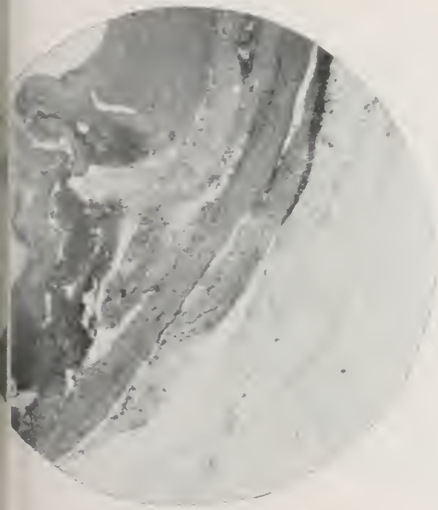


FIGURE XXXI.

har of the inferior turbinate following ization. Showing fibrinous organization papillary formation. Marked leucocytic tation. The pathologic condition of the ate was vascular hypertrophy.

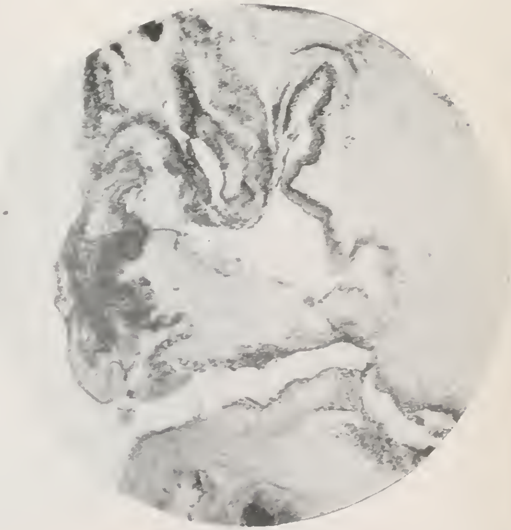


FIGURE XXXII.

Eschar following cautery eleven days after. Showing involution of the epithelium and covered with very thick, somewhat homogeneous exudate. Some fresh blood. The pathologic change of this turbinate was epithelial hypertrophy.

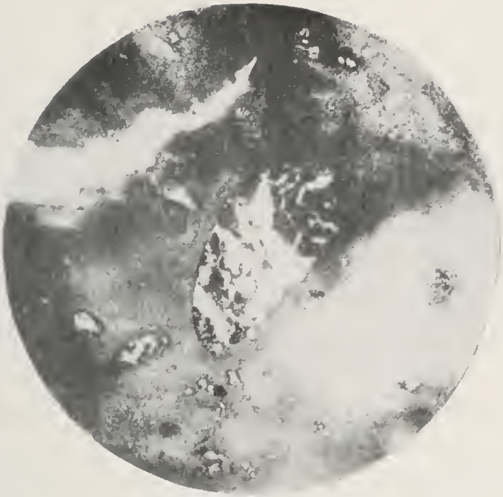


FIGURE XXXIII.

Exudate from nasal cavity following cautery of the inferior turbinate and bismuth injection as dressiing. Shows marked round cell infiltration surrounding masses of bismuth.

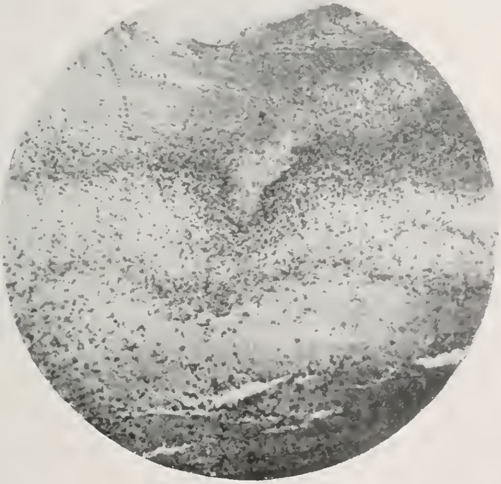


FIGURE XXXIV.

Fibrinous exudate. After ethmoid operation. Showing very marked leucocytic infiltration and fibrinous formation. Leucocytic appearance larger than either cautery or in lues.

LXI.

THE SOCIOLOGIC ASPECT OF DEAFNESS, CONGENITAL OR ACQUIRED IN EARLY LIFE, WITH A SUGGESTION FOR A BETTERMENT THROUGH INDIRECT EFFORT.

By H. B. Young, A. M., M. D.,

Burlington, Iowa.

If it were not for the twofold fact that otologists must eventually decide upon what constitutes total deafness, and will be looked to more and more to curtail its occurrence, both by prevention and treatment, this topic might be left wholly to the consideration of educators and economists. But the rosy view of the future for this class of unfortunates, painted by enthusiasts among the educators, doubtless encouraged thereto by enthusiasts among the otologists, bids fair to create an expectation on the part of the public, which, especially if it should not be realized, will make the legitimate work of both educators and otologists increasingly difficult.

According to John Dutton Wright,[1] there are approximately fifty thousand socalled "deafmutes" in the United States, for whom the great problem is to furnish more effective means of communication with their fellowmen, and more remunerative occupations, if they are to have the more intimate relations with society which, in his opinion, is their due. Of paramount importance is the means of communication; and that also, in his opinion, means nothing less than the use of actual speech associated with lip reading. In other words, we must teach the deaf to speak and to abandon the sign language. But this presupposes, first, that there can be found a sufficient number of teachers competent to carry on such a work, plus the munificent state to bear the expense; and, second, that the deaf will respond in a measure commensurate with the effort involved.

Assuming for the present that these teachers and funds will be forthcoming, although this remains to be demonstrated (for it is equivalent to the support of a small army), we must yet inquire about the prospects of response from the beneficiaries.

Of the thirteen thousand pupils now in the schools for the deaf (again I quote from Wright) and those in attendance for the past ten years, approximately seventy-five per cent have had oral instruction; but of these only twenty-five per cent have gone beyond the experimental stage, i. e., made practical use of it.

In the light of the estimate that twenty-seven per cent only of "deafmutes" are totally deaf, this naturally suggests two questions, viz.:

(1) Is this twenty-five per cent the intellectual limit of its application?

(2) Does it indicate the number of those who, after more or less practice, consider it an improvement on other modes of communication?

In considering the first question we must remember that total deafness means deficient brain capacity in varying grades, from just those things which would come to it through the medium of sound, to those grosser defects the sequelæ of the meningitis which is so often the causative factor. In consequence of this the seventy-three per cent who are supposed to retain "islands of hearing," and therefore more favorable subjects, may not all be eligible. In considering the second question we must estimate the influence of an artificiality in the process, recognized alike by the producer and receiver.

Makuen,[2] in his contribution to the symposium on "The Deaf Child," makes this statement: "Spontaneous speech development takes place only as the individual is capable of hearing speech sounds, both subjectively and objectively; and speech acquired in any other way is a forced and artificial product." To the deaf person, therefore, who objects to being in the "limelight," and that means most of them, this forced and artificial product will make small appeal; for its first effect, through unusual tone and inflection, is to make the user conspicuous.

Something like twenty years ago, while making with my colleague, Dr. Hobby of Iowa City, a systematic examination of the pupils in the Iowa School for the Deaf, the superintendent's son, himself a pupil, was exhibited as a triumph for oralism. Later, in the privacy of our room, we found ourselves in accord with this impression: "Heart-rending! Were it my child, I would rather it remained forever silent." And quite recently, in a man from the Philadelphia school, with exclusive oral instruction, I experienced the same shock. When I learned that this man could hear until the age of seven years, had but recently taken up the sign language, and now spoke with reluctance, I had further confirmation of early impressions. It may be that, in the not distant future, familiarity with this peculiar speech will soften or blunt our sensibility to it; but the intelligent deaf person can hardly escape the feeling that he or she will be, at best, just a little less a curiosity than Helen Keller. Incidentally, let me here remind you that of the multitude (a multitude that would doubtless pay willingly for the privilege) who gaze with awe, and mayhap inspiration, on Helen Keller's achievements, few stop to contemplate the patience, perseverance and resourcefulness of her teacher, which is infinitely more wonderful.

The task of bringing any class of defectives up to a reasonable equality with those of unimpaired faculties must always be colossal; not only from the standpoint of scientific achievement, but as well from the indisposition of the public to render the needed assistance. In this instance the great obstacle in the way of change is the feeling that the duty is already well done. The state furnishes as good a school for the deaf child as for the hearing, and in a material way does more for it, in that it also provides food and lodging—and clothing, if necessary. In Iowa such education is compulsory. The idea, too, that the deaf child must have an exclusive oral environment—absolutely barred from the language of signs, involving so much additional expense—may be met with skepticism; and for these reasons: (a) Every parent uses signs as a means of teaching the hearing child to speak. (b) The good preacher, good orator and good actor (and who of you has never been a devotee at the shrine of Punch and Judy?) is distinguished from the indifferent ones of his class by his ability to press his points with appropriate gestures and signs often more expressive than words. (c) Now that the Tower of Babel, with its "confusion of tongues" is again a reality, through the advent of thousands who speak, but not in our language, it has become a necessity to use the language of signs extensively in all the avenues of industry. (d) From time immemorial the deaf have been educated by a system of signs; in most schools are so educated today; and the majority of those who have acquired speech make more use of the signs. (e) In short, when 89,950,000 people are using the sign language, more or less, every day, it is hard to imagine a condition in which the 50,000 scattered broadcast, can be shut out from it.

The sign language, therefore, however much it may interfere with the development of oralism, is here to be reckoned with. Nor is it necessarily a relic of barbarism. At the recent Congress of the Deaf in Paris, a world's congress with educated people from many lands, the sign language prevailed and was found adequate for a general interchange of ideas.

As a matter of fact, everybody knows, or should know without such evidence, that the sign language is the only universal language. It seems, however, to be no less a fact that the general conception of it is wholly inadequate. Even De l'Epee, whose name is inseparably connected with its best known usage, had a singularly narrow view of its merits. Volapuk, which had its brief day, et id omne genus, were attempts at a universal language of words—a superhuman and, in view of the possibilities of signs as conveyors of ideas regardless of words, a gratuitous task. De l'Epee and his colleagues seem not to have risen above this weakness. Provision for words gave existence to the manual alphabet.

The real sign language, however, has to do only with subject, object and action, leaving each race to give them such word expression as it will; and may profitably be taught to the hearing as well as the deaf.

It must also be acquired just as any other language is acquired; and on this account it is best to start with it in childhood, before there is a definite knowledge of the construction of spoken language. This means, before grammar is taught. Some of us know, better or worse, the French, German, Italian, Spanish, etc., but only those of us who had such environment in childhood can express ourselves in these languages without that awkwardness which imperils our intelligibility to those of the mother tongue. Thus it is probable that none of us would ever become proficient in the sign language; but our children or grandchildren might become facile to a surprising degree, and that without a manual alphabet. For the manual alphabet need be only an incident, just as we spell out these technical expressions to the stenographer who might not transcribe them correctly.

When it is realized that one may think in signs the same as in words, which those skilled in their use really do, it may even be a matter of surprise that the sign language was ever considered a makeshift, and there were few to do it reverence.

As a basis for that systematic arrangement which is essential for the study of any language, we already have the so-called natural signs, which are practically common to all peoples. From these infinite elaboration is possible; but for the average person a thorough familiarity with these alone may be sufficient. The English language is composed of many thousand words, but the average person with fair education seems to get along with at best a vocabulary not exceeding two thousand; and a single sign may be equivalent to several words—sometimes more expressive.

That many desirable results could accrue in a general acquisition of the sign language seems almost beyond question. For present purposes, however, it is sufficient to point out:

(1) That through the element of personal profit in it, its teaching would command public interest and support.

(2) That through a common means of communication between the hearing and the deaf child they would be brought into closer relationship.

(3) That through this closer relationship there will naturally follow an appreciation of the blessing of hearing and the curse of deafness, now known only to those under the curse and those besought to lift it—an appreciation which will foster that sympathy so aptly described by Dr. John Brown of Edinburgh as the motive and not the emotion.

This argument, while in the main a plea for general instruction in the sign language for the purposes set forth, has also a medical bearing. Were it germane to the subject, I would make some observations on the difficulties attendant upon the determination of the degree of deafness in the deaf-mute, founded upon the examination, physical and functional, of the pupils in the Iowa School for the Deaf, to which I have referred; and how I thought I discovered that, in those with negligible drum change, the remnants of sound perception were mostly to be found in the left ear. But under the title, matters of policy alone may be appropriately considered.

The brilliant work of Wright and a few others who, like him, are advocates of oralism pure and simple, gives us, as otologists, a new question to consider when we are consulted about the management of the deaf child. Some of our number have already committed themselves as endorsers of this method for the child who possesses "islands of hearing," especially those within the "Bezold scale"; and they are men of standing, whose influence may go far with those who have limited association with this class of children. I cannot but think that this endorsement, if allowed to go unchecked, will work misfortune to the otologist and deaf child alike. It is not a question whether the deaf child can be made to speak. Undoubtedly the great majority of them can—some of course much better than others. It is rather a question whether the deaf child's welfare and happiness will thereby be measurably enhanced; and this has not yet been proven. However natural our expectations that oralism would do much that is claimed for it, be worth the added cost, we find, even in the last ten years with its largely increased practice, only sporadic realization of these expectations. It is hardly thinkable that this can be explained on any ground but natural causes, mostly beyond the range of human effort; and, on this account, it becomes our plain duty to warn the parents of deaf children against too great expectations, pointing out as far as may be the obstacles peculiar to the physical and mental make up of the individual and those dependent upon social conditions. For the latter I know of nothing more comprehensive than the declaration of the lady from whose letter Dr. Gallaudet quoted in his contribution to the symposium previously referred to. Every otologist should have a copy of this on his desk. (See Appendix.)

For the betterment of this social condition the general acquisition of the sign language, which I here advocate, may be looked upon as speculative; but from a well known teacher of the deaf, one who has spent practically his whole life among them, I have the assurance that such a course would be hailed with acclaim by the deaf.

APPENDIX.

In a recent letter a deaf lady of high social standing and unusual mental ability, who was educated in an oral school, writes as follows:

"It seems to me the pure oral teachers expect too much of both the deaf and the hearing. They think that the former should be capable of an equality with the latter, which is physically impossible. They think the hearing should receive the deaf with open arms, or at least meet them half way. They ought to, of course, but the practical question is, Do they? In most cases, no. Where there are deaf friends or relatives, something of interest and kindness will be shown by the hearing, but with ordinary people the deaf are simply strange creatures, like the idiotic or insane, though of course in a less degree. The great majority of oralists are absolutely ignorant of the way they are laughed at behind their backs. I myself knew nothing of this while I had home and family to ensure me respect, but I have had some bitter experiences since then.

"For this reason, if for no other, those with bad voices should not be forced to talk. They simply make themselves a laughing-stock among the hearing. I have been told that my voice was not specially disagreeable, yet I have known hearing friends to pass me on the street without recognition, and when I demanded an explanation, confess that they did not wish the friends they happened to be with to hear me speak. Is not that enough to seal the lips of any sensitive oralist?

"In all this I am putting myself in strong antagonism to my school, but it is not to be helped. Truth and common sense should be considered as well as theory, and with the theories of the pure oralists I cannot agree.

"I insist on signs and signs only in public speaking to the deaf. On March 20, 1910, I was present at the confirmation service at Trinity Church, Boston, where Mr. Smearing interpreted to us the sermon of Bishop Lawrence. When I came to read the printed report of that sermon I found nothing new. Had I been seated with the general audience, I should not have known a word from beginning to end."

REFERENCES.

1. Wright, John Dutton: Address to New York Association of Physicians. Volta Review.
2. Makuen: Laryngoscope, June, 1910.

LXII.

ETIOLOGY AND PROPHYLAXIS OF TUBERCULOUS LARYNGITIS.

By Julius Dworetzky, M. D.,

Otisville, New York.

I wish to submit to you a report of my work in the Nose and Throat Department of the New York City Sanatorium, at Otisville, New York. This report is based on the findings upon examination of six hundred patients, with special reference to one hundred and twenty-eight cases of laryngeal tuberculosis. Dr. W. L. Rathbun, physician in charge, requested me to write a paper on some of my work in addition to this report. Since the larynx is so readily prone to tuberculous infection, I decided upon "Laryngeal Tuberculosis" as the topic for the evening. However, as it is practically impossible to give a fair presentation of the subject in the short time at our disposal, I have chosen the "Etiology and Prophylaxis of Laryngeal Tuberculosis" as the title for my paper, leaving the pathology, diagnosis, symptomatology, and treatment for future presentation.

It is generally supposed that every specialist is inclined to overrate the specialty that he practices. I am in no position to argue this point, but I do wish to say that too great importance could never be attached to the specialty of the nose and throat, particularly when practiced in an institution of this character. Out of five hundred patients examined at the Otisville Sanatorium, laryngeal tuberculosis was diagnosed in one hundred and twenty-eight, or 25.6 per cent of the cases.

Laryngeal tuberculosis is a very sad and unfortunate complication of pulmonary tuberculosis. To emphasize this fact I wish to give you the opinion of some of our most eminent authorities. Brown claims that the average duration of life of a patient afflicted with chronic pulmonary tuberculosis is about eight years. The average duration of life of a patient suffering from laryngopulmonary tuberculosis is a great deal shorter. Sir St. Clair Thompson believes that tuberculosis of the larynx renders the prognosis of pulmonary tuberculosis twice as gloomy; and in the majority of cases it is incurable if not treated promptly. Most authorities give it from two to three years. This difference in length of life cannot easily be overlooked, and to me it seems that an affection of this character undoubtedly deserves close attention and careful study. Only then may we hope in the future to be able to lessen the frequency of occurrence of this grave complication.

Modern scientific medicine is largely based on the science of prophylaxis. Prophylaxis has been producing most wonderful results in reduction of mortality from pulmonary tuberculosis. In New York City alone there has been a decrease of forty per cent in mortality from tuberculosis between 1887 and 1902, a period of fifteen years. (Baldwin, Osler Modern Medicine.) To combat a disease with prophylactic measures is the most scientific, the most reasonable, and the most economic way. Could not prophylactic measures be taken to combat laryngeal tuberculosis as well? A great deal has been said about the treatment of laryngeal tuberculosis, medical as well as surgical, but very little has been spoken of the preventive treatment of this affection. There surely must be some reason or reasons for one patient developing laryngeal tuberculosis, while another with similar pulmonary lesion and apparently similar general condition is entirely free from clinical evidence of this disease. A question of this kind is of utmost importance and undoubtedly deserves unlimited consideration.

A successful struggle against a disease on preventive lines requires one to become thoroughly familiarized with all the factors concerned in the causation, and for this reason I intend to devote some of our time to the discussion of the "Etiology of Tuberculous Laryngitis."

Tuberculous laryngitis is undoubtedly secondary to tuberculosis elsewhere in the body. Primary tuberculosis of the larynx is of very rare occurrence. In an institution like ours it is no more than reasonable to assume that tuberculosis of the larynx is entirely secondary to that of the lungs; the direct cause being the tubercle bacillus. Out of six hundred patients, one hundred of which were children, one hundred and twenty-eight adults were found to have laryngeal involvement. No tuberculosis of the larynx was detected in any of the children. From this it would seem that tuberculous laryngitis is, for some reason or other, an affection mainly of adult life.

I also found that 28.8 per cent of the cases of tuberculous laryngitis were in the male, while only 20.7 per cent were in the female. Thus it would appear, from this study, that it is more common among male patients. On further study I noticed that one hundred and sixteen, or 91 per cent, of the patients were cases with positive sputum, a fact which is worth while noticing. Of the twelve negative cases, seven were of doubtful diagnosis as to the laryngeal lesion, three have not had a sufficient number of sputum examinations, while two had definite lesions with a persistent absence of bacilli in the sputum. Bullock, in his paper read before the Sixth International Congress on Tuberculosis, reports one hundred cases of tuberculous laryngitis, 25 per cent of which were ulcerative, and 75 per cent nonulcerative. He found a positive sputum in every case, a fact which almost agrees with our findings here.

I should next like to consider the mode of invasion of the larynx by the tubercle bacillus. Authorities still disagree. Heinze, Coakley and others believe the lymphatics to be the most common route of infection. Bonney, Ballenger and others regard the sputum from the lungs as chief conveyor of the infection. My observations here bear out the latter theory very well, by reason of the fact that only 9 per cent of our cases of tuberculous laryngitis have been negative, and most of these were either of doubtful diagnosis, or else did not have a sufficient number of sputum examinations. Of course, it might be claimed that the bacilli come from the ulcerations of the larynx; but then how would we account for the positive sputa in 62 per cent of the tuberculous laryngitis cases where no ulcerations were present? Therefore, it would really seem that a positive sputum is an "essential," or at least "one" of the essential factors in the development of tuberculous laryngitis.

Seventy and six-tenths per cent of adults of this sanatorium have or have had a positive sputum, while only 25.6 per cent of the adult patients have laryngeal tuberculosis.

The question would naturally arise, "Why do only 25.6 per cent of positive patients show clinical laryngeal tuberculosis, while the remaining 45 per cent of positives are apparently free? To me it seems that a correct answer may solve this gigantic problem and tell us how and why tuberculosis of the larynx is contracted. After having learned this we may be able to apply prophylactic measures, and thus indefinitely prolong hundreds of human lives.

I carefully talked this matter over with Dr. Rathbun, and upon his recommendation I proceeded to examine the nose, throat and larynx of every patient in this sanatorium, carefully noticing and classifying the pathologic conditions. Of the six hundred patients examined, I found that only two hundred and twenty-six larynges presented a normal appearance. The remaining three hundred and seventy-four were abnormal. Out of the latter, two hundred and forty-six showed signs of congestion and hyperemia without any local infiltration, and one hundred and twenty-eight showed more or less tuberculous involvement. This high percentage of catarrhal condition of the larynx suggested itself to me as a probable predisposing cause. As I just said, almost in every case we have an open pulmonary lesion which means a constant discharge of bacilli flowing over and bathing the laryngeal mucosa. The anatomy of the interior structures of the larynx is very complex, and pus traveling over it is bound to become stagnated and in that way adhere to the minute folds and creases. Healthy mucous membrane may be able to resist it by its natural immunity, but when inflamed, besides the minute abrasions that may be present as a result of it, the intercellular spaces become widened, and the bacilli, not meeting with any resistance, enter the mucosa and submucosa, setting up a tuberculous inflammation.

With the above theory in view as a probable modus operandi, I carefully questioned, examined and reexamined one hundred and twenty-eight cases of tuberculous laryngitis, and then classified them as to age, sex, sputum, pulmonary lesion, nasal obstruction or disease, inflammation of pharynx, tonsils and soft palate, history of "colds," excessive use of voice, cough, use of tobacco and alcohol. The findings were most interesting, and on account of their important bearing on the subject I wish to give them to you in detail.

Age.—All cases of tuberculous laryngitis were found in adults, most of them between the ages of twenty and forty-five. No tuberculous laryngitis was detected among one hundred patients below fourteen years of age. This may partially be explained by the fact that only 5 per cent of the children have had a positive sputum. It would be hard to account for the absence of tuberculous laryngitis in children, if we were to accept the lymphatics as the most common route of invasion, for children are very prone to tuberculosis of the bronchial and cervical glands.

Sex.—28.8 per cent of tuberculous laryngitis occurred in males, while only 20.7 per cent occurred in females. This may be accounted for by the fact that 80 per cent of the males had a positive sputum, while in the females it was present only in 56 per cent. Also by the fact that men use tobacco and alcohol, while their use among women is so limited that we may disregard them as factors. Men are also more subject to exposure.

Sputum.—One hundred and sixteen, or 91 per cent, of the adult patients with tuberculous laryngitis have or have had a positive sputum. Out of the remaining twelve patients, seven are still of doubtful diagnosis as to the laryngeal lesion, three have not had a sufficient number of sputum examinations, while two were persistently negative.

Nasal obstruction or diseased condition of nasal chambers, in my mind undoubtedly acts as predisposing factor. As you all know, the nose, outside of the special function of smell, has two other very important functions. First, is the function of respiration. The air as it goes through the nose, before it reaches the larynx and the lungs, becomes modified. The outside air is very seldom of the proper temperature to enter the lungs, and for that reason as it passes through the nasal chambers it is warmed by the blood circulating through the mucous membrane of the nose, and in that way made fit for assimilation in the lungs. Besides being warmed the air also is moistened. This function belongs to the mucous secreting glands and the "swell bodies" of the inferior and middle turbinates. It has been estimated that about one pint of serum is thus transferred from the nasal mucous membrane to the lungs in twenty-four hours. The nose also acts as a filtering medium by means of the hairs in the vestibule and the nasal mucous lining. The latter with its moist surface catches the very fine particles of dust which may have escaped the hairs. The warming and moistening of the air is absolutely essential for the protection of the delicate structures in the lower part of the respiratory tract from the great variation in extreme temperatures.

Another and very important function, as claimed by Ballenger, is that of ventilation of the nasal accessory sinuses. As you are aware, all the accessory sinuses are in direct communication with the nasal chambers through ducts and channels, and any interference with the ventilation of the sinuses, as by a growth, enlarged middle turbinate, etc., will cause a lowering of resistance of the lining mucous membrane, while the diminished amount of oxygen will allow the secretion to undergo rapid decomposition.

With these two above described functions in mind, we can easily see how a deviation from the normal anatomy will cause interference with above functions, i. e., respiration and ventilation of the accessory sinuses, and subsequently produce a pathologic condition.

After having briefly considered the function of the nose, I wish to take up the pathogenesis of nasal obstruction. Ninety-two per cent of the cases of tuberculous laryngitis were found to have nasal obstruction or disease; 36.7 per cent having slight obstruction; 18 per cent having moderate obstruction; 8 per cent marked; and 29.3 per cent suffering from either an atrophic or suppurative condition of the nose. Ballenger claims a deflected septum as one of the great predisposing factors to all kinds of rhinitis. At this sanatorium, 60.8 per cent of all the patients present more or less abnormality of the septum.

When a septum is deflected, one chamber is naturally larger than the other and more air will therefore circulate through it. With an increase in the amount of inflowing air, there is an increase in function of the turbinates of that side, and therefore a compensating hypertrophy. At first the hypertrophy is of the soft or turgescent type, which consists merely of an engorgement of the venous plexuses of the "swell bodies" of the turbinates. But in the course of years, if this condition is not remedied, a real hypertrophy of the turbinates may occur, on account of the hyperemia and consequent increased nutrition. If the obstruction exists higher up in the neighborhood of the middle turbinate, the retention and decomposition of the secretion in the superior meatus and the posterior ethmoidal cells will cause a prolonged low grade irritation which will result in hyperplasia of the turbinates, causing a hyperplastic rhinitis, which is characterized by an increased formation of connective tissue cells. We are all familiar with the tendency of connective tissue to contract. As time goes on, the connective tissue will keep on contracting, thus cutting off the blood supply and choking the glandular structures. The subsequent result is atrophy with formation of scabs. Of course, the above, although true in many instances, does not necessarily mean that every case of deflected septum will cause a turgescent rhinitis which will finally terminate in the atrophic form. The pathologic process may be arrested at any point. Some cases can be averted by medical or surgical means, a great many will be checked by nature, while the rest will probably take the course as outlined above.

An abnormal condition in the nose will eventually produce a mild inflammatory condition in the larynx, due to the irritation caused by the improperly modified air. Patients with nasal obstruction finally become partial or total mouth breathers, and in that way deprive the inspired air of the proper amount of warmth and moisture. Those suffering from an atrophic condition, in spite of the patency of the nasal chambers, likewise do not receive properly modified air, on account of the destruction and atrophy of the mucous membrane with its venous plexuses and glands.

So much for abnormal nasal condition as a predisposing cause to tuberculosis of the larynx.

Pharyngitis may be considered as another predisposing factor to tuberculous laryngitis. Seventy-nine per cent of the cases of tuberculous laryngitis were found to be suffering from chronic pharyngitis. Chronic pharyngitis is mainly due to improper breathing, and is therefore considered as secondary to chronic rhinitis. The mucous membrane of the pharynx is continuous with that of the larynx, and there is no reason why a chronic inflammation of one should not extend to the other. Then again, we are all familiar with the fact that all patients with pharyngitis or nasopharyngitis have a persistent desire to clear their throats. They usually do it by hawking and coughing, an act which by itself would tend to cause a congestion of the larynx. The mucoid or mucopurulent secretion acts as a mild irritant, producing chronic congestion and inflammation and a constant desire to cough and expectorate. Personally I believe that a great proportion of the sputum of the patients of the sanatorium is nothing more than the secretion from the nasopharynx, and by treating the latter the amount of sputum could be greatly reduced in many instances.

Tonsillitis and Diseased Condition of the Soft Palate.—Sixty per cent show a diseased condition of the tonsils or soft palate, which means nothing more than repeated attacks of acute inflammation. It is no more than reasonable to assume that in many instances of tonsillitis the inflammation also extends to the laryngeal mucosa, thus with each attack lowering its resistance.

Subject to "Colds."—Sixty per cent of the cases give a history of being very susceptible to "colds." This naturally suggests many previous attacks of acute rhinitis, pharyngitis, and tonsillitis. One attack followed by others usually leads to chronicity, which merely confirms the above statistics.

Overuse of Voice.—Thirteen per cent of the cases give a history of excessive use of voice—like teaching, singing, proofreading, etc. We can all easily see how this will cause congestion, chronic hyperemia and lowered local resistance of the larynx.

Cough is another very important factor. One hundred and twenty-six, or 98.5 per cent, of the cases give a history of cough extending over a period of from a few months to many years. Although most of the coughing is probably of pulmonary origin, we must not forget that a cough may also be due to some abnormality in the nose, pharynx, or larynx. Continuous coughing will in time cause a congestion of the larynx and later produce a catarrhal condition. At this stage it is evident enough how the cough can become laryngeal and in that manner complete the vicious circle. Personally I believe that a great deal of the coughing is due to some irritation in the nose, pharynx, or larynx, and by local treatment the cough could be greatly diminished.

I can distinctly recall the case of a patient with a third stage pulmonary lesion complaining of excessive cough, especially at night on lying down, so that he could hardly gain any sleep. Upon examination I found a markedly elongated uvula resting on the dorsum of his tongue, even with the tongue depressed. I amputated the uvula, and the very same night the patient rested most comfortably without even coughing once. His sputum also became decreased to half of the previous amount.

Tobacco.—Smoking may also be looked upon as a contributing factor. We are all familiar with the effects of smoking on the pharynx. Is there any reason why a similar condition should not occur in the larynx? Seventy-eight and five-tenths per cent of the male patients give a history of continued use of tobacco, 40 per cent having used it to excess. According to our statistics here, tuberculosis of the larynx is about one and one-half times as common in the male as in the female, and smoking would naturally suggest itself as one of the reasons for this discrepancy.

Alcohol may play a prominent rôle as a predisposing etiologic factor. It may act directly by causing irritation of the neighboring organs, or indirectly through the circulation. Forty-two per cent of the men give a history of the use of alcohol, many of them to excess. This, too, may be one of the reasons for the greater frequency of tuberculosis of the larynx among the males.

Last, but not least, I wish to consider the general condition of the patient as a predisposing factor. Most authorities agree that about 90 per cent of the people have more or less tuberculosis in some part of their system, and it is only on account of lowered vitality and superinfection that some of these develop clinical tuberculosis. The same is undoubtedly true of tuberculosis of the larynx. Incipient cases are more resistant to laryngeal tuberculosis than the more advanced cases. The reason for this is that in incipient cases the general resistance is usually good as compared with that of the more advanced cases, and the infection itself is not as overwhelming as in cases of more or less advanced tuberculosis. Upon examination of five hundred adult patients, I found that tuberculous laryngitis was present in 12 per cent of the incipient cases, 26.4 per cent of the moderately advanced, and 45.3 per cent of the advanced cases.

In summing up the above, I wish to say:

First, that tuberculosis of the larynx is apparently caused by the direct invasion of the mucous membrane of the larynx by the tubercle bacillus. If the lymphatics were the main channel of infection, then why is tuberculosis of the larynx so rare or almost absent in closed pulmonary lesions?

Second, that a predisposing cause is almost as essential as the direct cause; and anything that tends to congestion and chronic catarrhal inflammation of the larynx should be considered as a predisposing factor. If only the bacillus tuberculosis were necessary for the causation of clinical tuberculosis of the larynx, then why do not all patients with positive sputa develop tuberculous laryngitis?

PROPHYLAXIS.

Now I wish to briefly take up the prophylaxis of tuberculous laryngitis. As I mentioned early in my paper, much has been written on the curative treatment of laryngeal tuberculosis, while the prophylactic phase has apparently been neglected. In speaking of the actual treatment, all authors, without exception, agree on the absolute necessity of vocal rest in addition to the hygienic and the dietetic treatment. Besides the above, most of them also believe in the medical or surgical treatment. Bullock is a great believer in the efficiency of formalin solution in the treatment of tuberculous laryngitis. Minor advocates the use of iodoform. Other authorities advise the use of lactic acid and other astringents. The electric cautery has been used by many with very good results. Pettit claims that he healed from 70 to 85 per cent of incipient laryngeal tuberculosis by the cauterization of the diseased tissues. Wood claims that his experience with the electric cautery in laryngeal tuberculosis has led him to almost discontinue any other method of treatment. Arnoldson, in the *Journal of Progressive Medicine,* believes that medical treatment has little influence on the course of the disease, and advocates endolaryngeal surgical measures. Tuberculin has been used with varied success.

So far no specific remedy has been discovered for this affection. Personally I believe that different modes of treatment are applicable to the different phases of the disease. Some early cases will undoubtedly do well under general treatment and vocal rest. In cases of soft granulating ulceration, formaldehyd seems to be of some value.

Cases that have advanced considerably will very seldom yield to any local remedy, and the expectant treatment and the treatment of the symptoms as they arise are about the only things that can be done in their behalf.

However, we have learned that tuberculous laryngitis is a secondary disease, occurring mainly in adults with positive sputum; furthermore, we may assume that tuberculosis of the larynx, like tuberculosis elsewhere in the body, has a direct causative factor, i. e., the tubercle bacillus and predisposing factors like those enumerated above. Therefore, we face the following question: "Are we justified in adhering to the hitherto generally adopted policy of merely treating the disease as it arises, without making an earnest effort at prevention?"

To prevent tuberculosis of the larynx we must, first, combat and check the direct cause. Second, remove the predisposing factors.

To accomplish the first, we must treat the patient's pulmonary lesion and also improve his general condition. Our methods of treatment at the Otisville Sanatorium fully cover this point. Our constant aim is, on the one hand, to check the activity of the pulmonary lesion by endeavoring to promote fibrosis; and, on the other hand, to raise the patient's general resistance and render him more or less immune.

This general treatment, although most excellently applied and carried out at our sanatorium, does not very often accomplish the most desired purpose, i. e., the permanent healing of open lesions. Therefore, not being able to remove the direct cause, the only and most logical thing to do would be to raise the local resistance of the larynx.

Here I think it in place to briefly mention the routine adopted by the throat department of our sanatorium. Each patient on admission has to undergo a thorough nose, throat and ear examination. The findings are carefully noted.

Recently we have instituted a system of books in which the patients are classified as to the previous history, age, sex, habits, pathologic findings, symptoms, etc. After carefully examining the patient we are in a position to advise him of any detected abnormality which later may have some influence on his larynx. A deflected septum causing more or less trouble is of common occurrence. Most recent authorities seem to regard a deflected septum as the underlying factor of many pathologic conditions. A deflected septum with consequent obstruction in respiration or drainage should be corrected. The modern submucous resection is a most excellent operation, and in the hands of a skillful rhinologist most always meets with success. The operation can be easily done under local anesthesia, and by taking the proper precautions there is not much loss of blood. The average patient can stand the operation easily without subsequent ill effects.

Many patients will be greatly benefited by the removal of an hypertrophied middle turbinate, which very often obstructs the drainage from the accessory sinuses. The operation is very simple also and can be done under local anesthesia.

Cases of obstructed nasal breathing due to enlarged inferior turbinates should be carefully studied before resorting to any particular method of treatment. We must always remember that our aim is not only to obtain patent nasal chambers, but also to preserve the condition of the mucous membrane of the nose as nearly normal as possible. The inferior turbinates contain most of the "swell bodies" of the nose, and by removing them we deprive the nose of its physiologic efficiency. The patient afterwards complains of dryness and irritation in the nose and neighboring organs. Most cases with enlarged turbinates have deflected septa, and by correcting the latter the turbinates later on will usually become of normal size. When the enlargement is of the turgescent type, and if a septal operation is unnecessary, the galvanocautery will give great relief.

A coexisting pharyngitis or nasopharyngitis should also be treated. Here medical treatment and the use of the galvanocautery are of great service.

Elongated uvulas with a history of excessive cough should be amputated.

Patients with diseased or hypertrophied tonsils and adenoids should be carefully questioned as to previous attacks of tonsillitis, and if such history be obtained the tonsils and adenoids should be removed.

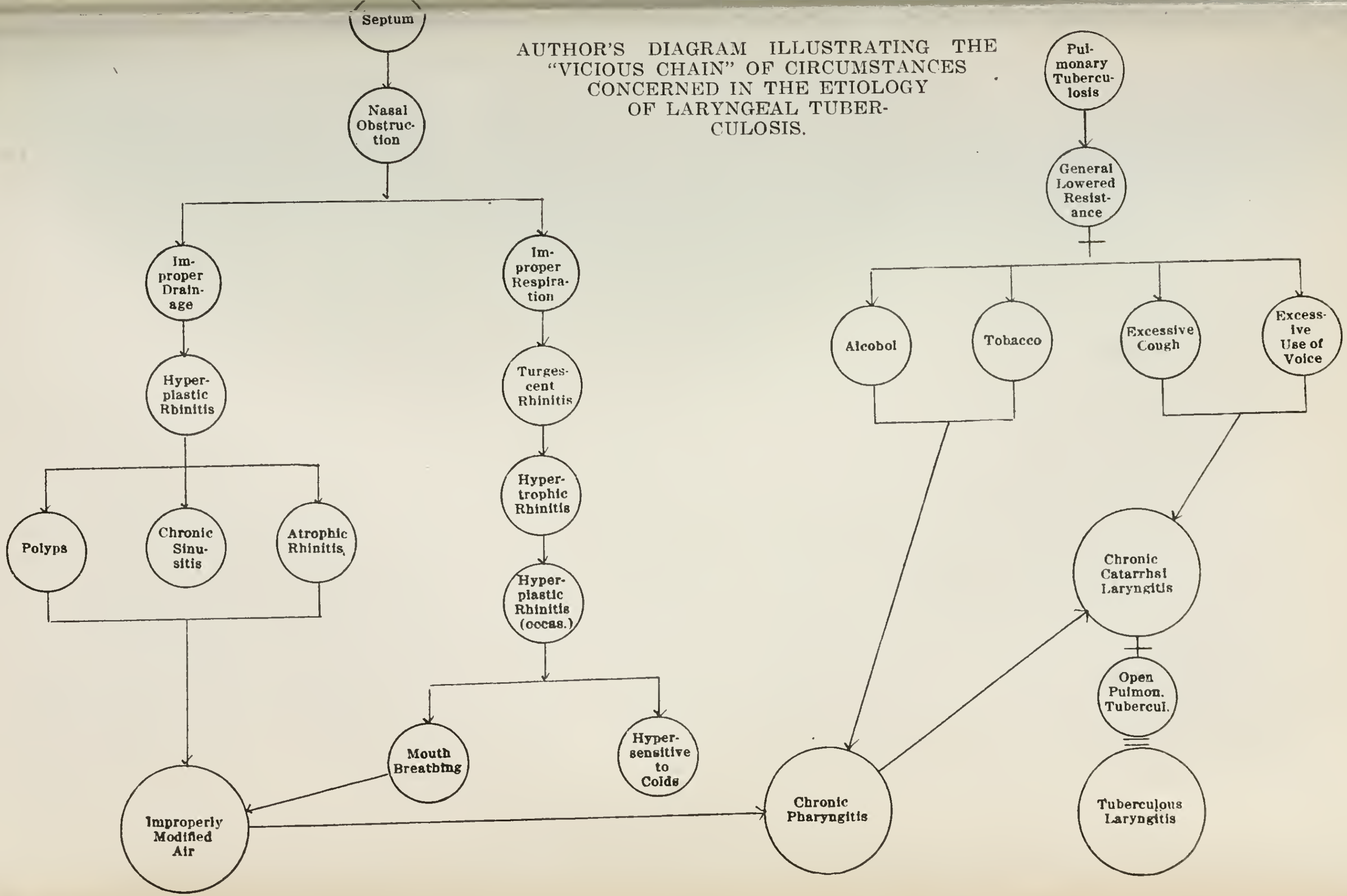
Patients with pulmonary tuberculosis, especially those with open lesions, should be dissuaded from excessive use of voice.

The use of tobacco, like the use of alcohol, should be greatly restricted. Here of course a great deal of individualization will be necessary.

Cough of pulmonary origin and not excessive is always best left alone. Excessive cough should be treated by sedatives. Cough of extrapulmonary origin should be combated by treating the underlying cause.

Finally, patients that show congestion or anemia of the

AUTHOR'S DIAGRAM ILLUSTRATING THE "VICIOUS CHAIN" OF CIRCUMSTANCES CONCERNED IN THE ETIOLOGY OF LARYNGEAL TUBERCULOSIS.



larynx should be carefully watched and examined at frequent intervals. The congestion, although a result of morbid condition of the neighboring organs, should be treated. I find that in addition to the treatment of the neighboring organs, a spray of 5 per cent solution of menthol in olive oil has a very beneficial influence. The menthol causes slight anesthesia and a constriction of the blood vessels which is of more permanent character than that of cocain or adrenalin. It also has a soothing influence on the mucous membrane. Catarrhal laryngitis accompanied by a tracheitis is specially benefited by repeated intratracheal injections of the same solution.

By carrying out the above briefly outlined prophylactic treatment, I earnestly believe that although tuberculosis of the larynx will not be entirely eradicated, it will and it must become a complication of less frequency than at present.

I therefore enter a plea for the adoption of strenuous measures in the carrying out of the prophylactic treatment of tuberculosis of the larynx.

I have drawn up a diagram illustrating what I designate as the "vicious chain" of circumstances concerned in the etiology of laryngeal tuberculosis. On a separate sheet you will find my classification of laryngeal tuberculosis. Finally, I wish to bring to your notice a statistic report. All of these I will now pass around.

I am greatly indebted to Dr. Rathbun for his advice and many suggestions; also to the resident staff for their kind cooperation.

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DEFINITION OF TERMS.

NARES.

1. Rhinitis.

(a) Turgescent Rhinitis.—Soft or turgescent swelling of the inferior or middle turbinates.

(b) Hypertrophic Rhinitis.—Causing partial stenosis of nasal chambers, hypertrophy of mucous membrane of inferior or middle turbinates.

(c) Hyperplastic Rhinitis.—Increase of thickness of mucous membrane as a result of prolonged mild irritation by secretion from accessory sinuses.

Polypi.—A later result of above condition.

(d) Atrophic Rhinitis.—Characterized by a sclerotic change in the nasal mucous membrane and occasionally of the underlying bone, and by presence of crusts and frequently offensive nasal breath.

Atrophic Rhinitis With Collapse of Erectile Tissue.—Not true inflammatory. Due to general anemia and characterized by atrophy of erectile tissue of nose.

SEPTUM.

1. Deflection.

First Degree.—Slight deviation from normal, without marked obstruction in respiration or drainage.

Second Degree.—Moderate deviation from normal, with moderate or occasional obstruction in respiration or drainage.

Third Degree.—Marked deviation from normal, with more or less constant obstruction in respiration or drainage.

2. Thickening.

First Degree.—Slight amount of hypertrophy of mucous membrane.

Second Degree.—Moderate amount of hypertrophy of mucous membrane.

Third Degree.—Marked hypertrophy of mucous membrane or septum.

3. Spurs.

Prominent outgrowth of cartilage or bone from septum.

4. Accessory Sinuses.

Sinusitis.—Chronic inflammation of one or more of the accessory sinuses.

PHARYNX.

1. Acute Catarrhal.

Acute inflammation of mucous membrane of pharynx.

2. Chronic Granular.

Hyperplasia of mucous membrane of pharynx, accompanied by increase of size of lymph follicles.

3. Hypertrophic.

Thickening and hypertrophy of mucous membrane of pharynx.

4 Atrophic Pharyngitis or Pharyngitis Sicca.

Atrophy of mucous membrane of pharynx.

UVULA.

1. Hypertrophied.

Increase in size.

2 Elongated.

Increase in length, resting or nearly resting on base of tongue.

TONSILS.

1. Hypertrophied.

First Degree.—Slightly enlarged in size.
Second Degree.—Moderately enlarged in size.
Third Degree.—Markedly enlarged in size.

SOFT PALATE.

Hypertrophied Fauces.

Usually accompanies hypertrophied tonsils or granular pharyngitis.

LARYNX.

Congested.

Under which come "acute and chronic catarrhal."

Tuberculosis.

Part or entire larynx presents appearance of tuberculous inflammation.

Stage A.—Doubtful stage.
Stage 1.—Stage of infiltration.
Stage 2.—Stage of ulceration.
Stage 3.—Advanced stage.

For detailed definition of stages, see "Classification of Tuberculous Laryngitis."

AUTHOR'S CLASSIFICATION OF TUBERCULOUS LARYNGITIS.

Class A.—Doubtful stage.

1. Sputum positive or negative.
2. Hoarseness in morning or persistent; may be absent.
3. Dysphagia present or absent.
4. Congestion or anemia of part or entire larynx.
5. Slight hyperplasia of interarytenoid space; may be absent. Patients of this class are repeatedly examined at intervals of two weeks. They are either discharged as cases of nontuberculous laryngitis, or, on further development of laryngeal physical signs and symptoms, are admitted to Class 1.

Class 1.—Stage of infiltration.

1. Positive sputum. Negative in exceptional cases.
2. Recurrent or persistent hoarseness.
3. Dysphagia present or absent.
4. Signs of infiltration of any or all the parts of the larynx, especially interarytenoid space, vocal cords, aryepiglottidean folds, ventricular bands, arytenoid cartilages, or epiglottis.

Class 2.—Stage of edema with superficial erosion.

1. Positive sputum.
2. Persistent hoarseness.
3. Dysphagia present or absent.
4. Dysphonia present or absent.
5. Signs of tumefaction of part of larynx with superficial erosion.

Class 3.—Advanced stage.

1. Positive sputum.
2. Marked hoarseness or aphonia.
3. Dysphagia present or absent.
4. Dysphonia present or absent.
5. Marked tumefaction and ulceration of any or all parts of the larynx.
6. Perichondritis sometimes present.*

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*Hoarseness, dysphonia and aphonia are usually absent in tuberculous involvement limitied to the epiglottis.

NUMBER OF PATIENTS EXAMINED.		Total.		%.
Male	332			55.3
Female	268			44.7
Nares.	600	600		100.00
Normal		209		34.9
Rhinitis		391		65.1
Turgescent	101		16.8	
Hypertrophic	201		33.5	
Hyperplastic	26		4.3	
Atrophic	63		10.5	
Septum.				
Normal		235		39.2
Abnormal		365		60.8
Deflected	188			31.3
Deflected 1 degree	120		20.	
Deflected 2 degrees	50		8.3	
Deflected 3 degrees	18		3.	
Thickened	179			29.8
Thickened 1 degree	120		20.	
Thickened 2 degrees	55		9.1	
Thickened 3 degrees	4		.7	
Spurs and ridges	47			7.8
Cartilage removed	6			1.
Ulceration and atrophy	11			1.8
Perforation	5			.8
Pharynx.				
Normal		357		59.5
Chronic pharyngitis		243		40.5
Palate and Uvula.				
Normal		416		69.4
Abnormal		184		30.6
Hypertrophied fauces	72		12.	
Inflamed fauces	60		10.	
Elongated uvula	73		12.	
Inflamed and thickened uvula	30		5.	
Cleft palate	1			
Tonsils.				
Normal patients		408		68.
Hypertrophied		192		32.
Hypertrophied 1 degree	133		22.1	
Hypertrophied 2 degrees	46		7.7	
Hypertrophied 3 degrees	13		2.2	

THROAT TREATMENTS, MEDICAL AND SURGICAL, INCLUDING ELECTRIC CAUTERIZATION, FOR PAST SIX MONTHS, FROM FEBRUARY 1 TO AUGUST 1, 1914.

FEMALE UNIT.

February	59	
March	60	
April	55	
May	72	
June	120	
July	123	
Total		489

MALE UNIT.

February	80	
March	91	
April	47	
May	58	
June	90	
July	94	
Total		460
Total male and female units		949

LARYNX.

MALE UNIT.

		Total.		%.
No. of patients examined, including 25 children under 14		332		100.
Normal		105		31.7
Abnormal		227		68.3
Congested	139		42.	
Tuberculous laryngitis	88		26.	
Stage A		11		12.
Stage 1		53		61.
Stage 2		19		21.
Stage 3		5		6.
Total number of adult patients		307		
Percentage of tuberculous patients in male adults				28.8

FEMALE UNIT.

		Total.		%.
No. of patients examined, including 75 children under 14		268		
Normal		121		45.1
Abnormal		147		54.9
Congested	107		39.9	
Tuberculous laryngitis	40		15.	
Stage A		3		7.5
Stage 1		25		62.5
Stage 2		11		27.5
Stage 3		1		2.5
Total number of adult patients		193		
Percentage of tuberculous laryngitis in female adults				20.7
Average percentage of tuberculous laryngitis of all patients, male and female adults				25.6
Average percentage of tuberculous laryngitis of all patients, including 100 children under 14 years				21.3

Including Children Under Fourteen Years.

Female Patients.

Positive sputum	105	40.0%
Negative sputum	156	60.0%
	261	

Male Patients.

Positive sputum	227	73.5%
Negative sputum	82	26.5%
	309	

Total Female and Male Patients.

Positive sputum	332	58.2%
Negative sputum	238	41.8%
	570	

Total number of females	261
Total number of males	309
Total number of patients	570

Percentage of positive cases	58.2
Percentage of negative cases	41.8

Not Including Children Under Fourteen Years.

Female Patients.

Positive sputum	105	56.4%
Negative sputum	81	43.6%
	186	

Male Patients.

Positive sputum	227	80.0%
Negative sputum	57	20.0%
	284	

Total Female and Male Patients.

Positive sputum	332	70.6%
Negative sputum	138	29.4%
	470	

Total number of females	186
Total number of males	284
Total number of patients	470

Percentage of positive sputum	70.6
Percentage of negative sputum	29.4

Classification of 500 Adult Patients According to Their Pulmonary Stages.*

	Male.	Female.	Total.
Stage 1	74	50	124
Stage 2	185	118	303
Stage 3	48	25	73
	307	193	500

Classification of 128 Cases With Laryngeal Tuberculosis According to Their Pulmonary Stages.

	Male.	Female.	Total.
Stage 1	11	4	15
Stage 2	59	21	80
Stage 3	18	15	33
	88	40	128

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*Pulmonary stages classified according to the National Association for the Study and Prevention of Tuberculosis.

FREQUENCY OF OCCURRENCE OF LARYNGEAL TUBERCULOSIS IN THE DIFFERENT PULMONARY STAGES.

Stage 1	15 cases out of 124	12.0%
Stage 2	80 cases out of 303	26.4%
Stage 3	33 cases out of 73	45.3%

STATISTICAL CLASSIFICATION OF 128 CASES OF LARYNGEAL TUBERCULOSIS AS TO ETIOLOGIC FACTORS.

	Male Unit.		Female Unit.		Total.	
Patients.	No.	%.	No.	%.	No.	%.
Total number	88	69.	40	31.	128	100.
Sputum.						
Positive	81	92.	35	87.5	116	91.
Negative	7	8.	5	12.5	12	9.
Age.						
Below 14	0	0	0	0	0	0
Above 14	88	100.	40	100.	128	100.
Pulmonary Stage.						
Stage 1	11	12.5	4	10.	15	11.5
Stage 2	59	67.	21	52.5	80	62.5
Stage 3	18	20.5	15	37.5	33	26.
Laryngeal Stage.						
Stage A	13	14.5	3	7.5	16	12.5
Stage 1	54	61.	25	62.5	79	61.5
Stage 2	13	14.5	11	27.5	24	19.
Stage 3	8	10.	1	2.5	9	7.
Nasal Obstruction.						
Total number	82	93.	36	90.	118	92.
Slight	33	37.5	14	35.	47	36.7
Moderate	13	15.	10	25.	23	18.
Marked	9	10.	1	2.5	10	8.
Atrophic and sup'tve	27	30.5	11	27.5	38	29.3
Pharyngitis.						
Total number	75	85.	26	65.	101	79.
Hypertrophy and Inflammation of Tonsils and Soft Palate.						
Total number	59	67.	18	45.	77	60.

	Male Unit.		Female Unit.		Total.	
Subject to "Colds."	No.	%.	No.	%.	No.	%.
Total number	50	56.	27	67.5	77	60.
Overuse of Voice.						
Total number	10	11.	7	17.5	17	13.
Cough.						
Total number	88	100.	38	95.	126	98.5
Slight	30	34.	8	20.	38	29.5
Moderate	27	30.	13	32.5	40	32.
Excessive	31	36.	17	42.5	48	38.
Tobacco.						
Total number	68	77.5				
Slight	16	18.2				
Moderate	28	32.				
Excessive	24	27.3				
Alcohol.						
Total number	37	42.				
Slight	17	19.				
Moderate	14	16.				
Excessive	6	7.				

LXIII.

THE INFLUENCE OF THE NOSE ON EYE AFFECTIONS AS EVIDENCED BY A CASE OF BILATERAL BLINDNESS AND ONE OF UNILATERAL SCINTILLATING SCOTOMA CURED BY OPERATIONS ON THE ETHMOID CELLS.*

By H. W. Loeb, M. D.,

St. Louis.

Although many reports have been made showing the influence of the accessory cavities of the nose in the production of serious ocular disturbance, we are still in the dark as to the manner by which the condition results.

Furthermore, we do not know why it is that the affection occurs in one instance, when in what appears to the observer an identical or similar condition, nothing of such a nature takes place. We have already been made familiar with those cases of extensive caries of the body of the sphenoid and of the lateral mass of the ethmoid without the slightest disturbance of ocular function. And yet there are other cases in which the accessory cavities are only slightly affected, while the accompanying condition of the eye, be it causal or coincidental, is extremely grave.

The studies in the anatomy of the region made during the past few years have fairly well established the anatomic relations. The pathologic side, however, is still far from satisfactory by reason of the infrequency of autopsies in these cases and the length of time which usually intervenes between the appearance of the symptoms and the performance of the autopsy.

The clinical side has been greatly increased by the numerous additions to the record of the reported cases. To this record I desire to add two, one of blindness and one of scintillating scotoma, both cured by operation on the ethmoid cells.

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*Read before the American Laryngological Association, May, 1914.

Case 1.—Bilateral blindness, acute ethmoiditis, entirely relieved by exenteration of the ethmoid cells.—S. P. C., aged sixteen years, unusually large and well developed for his age, was referred to me by Drs. M. H. Post, M. A. Bliss and J. F. Harrison, August 1, 1912. During the previous five weeks he had suffered from great loss of sleep and intense headache, the pain being localized over the supraorbital region on both sides. He began to notice reduction in his vision three weeks before. This increased day by day until, when I saw him, he was almost blind. A few days before, he had a severe bleeding from the nose, resulting from a fall due to his decreased vision. The patient did not complain of any dizziness, though there had been some nausea but no vomiting.

Examination revealed extreme sensitiveness in the region of the inner canthus, above and below. Both inferior turbinates were of usual size, no swelling being manifest. The septum was quite straight, no ridges or deviations being present. Both middle turbinates were greatly swollen, but no pus was at first discoverable. Upon thoroughly cocainizing the middle turbinate area, a thin streak of pus was found coming from the region of the orifice of the posterior ethmoid cells on both sides.

In view of the history and findings, I gave the opinion that his condition was due to an acute ethmoiditis, which, so far as I could then ascertain, was suppurative in character. A radiograph showed the region of both ethmoid labyrinths obscured, frontal sinuses small but clear, and no evidence of trouble in the maxillary sinuses.

Ophthalmoscopic examination at this time by Dr. Post and Dr. Shahan showed vision 1/192 O. D.; 3/120 O. S.; swelling of the disc + 4 D., O. D.; + 6 D., O. S.

I removed a large portion of the middle turbinates and cleared out the anterior and posterior ethmoid cells on both sides, and found the mucosa over the turbinates and within the cells considerably thickened. One cell wall was completely filled with the thickened mucosa which partook of the nature of a granulation. A very small amount of pus was encountered during the operation. The whole appearance was that of a recent marked ethmoiditis just becoming purulent in character.

The patient began to improve immediately. He was practically blind before the operation, and within twelve hours afterwards he could recognize the large monogram on the hospital spoons. He left the hospital in one week with his vision almost completely restored.

Examination by Drs. Post and Shahan showed progressive improvement in vision as follows:

	O. D.	O. S.
August 1st (on admission)	1/192	3/120
August 3rd (after operation)	3/75	3/12
August 4th	10/38	10/19
August 5th	10/24	10/19
August 6th	10/15	10/15
August 8th	20/24	20/24
August 29th	20/12	20/19
September 18th	20/15	20/15
December 14th	20/12	20/12

The swelling of the disc, as ascertained by both Dr. Post and Dr. Shahan, showed progressive recession, from O. D. 4 D., O. S. 6 D. on August 1st, to O. D. 1 D., O. S. 1 D. on August 29th.

Since this time he has had no further trouble with vision or headache. It seems to me that we have in this case a condition analogous to that of edema glottidis, supervening upon an adjacent grave infection, as, for instance, in deep suppurations of the mouth and pharynx. In these cases as soon as the focus is relieved the edema rapidly disappears. Here, too, the condition rapidly improved when presumably the infecting tissues were removed.

The literature shows a fairly large number of cases of blindness which has been relieved by surgical attention directed to the accessory sinuses of the nose. While in a few instances the infective focus was in the ethmoid, maxillary or frontal, in the main the sphenoid was at fault. Few cases, however, have shown such a positive dependence on a process in the ethmoid, or such a coincident and consistent recovery as the one here reported.

Case 2.—Unilateral scintillating scotoma; chronic ethmoiditis. Entirely relieved by exenteration of the ethmoid cells.—Miss L. L., aged sixteen years, August 27, 1913, had been having for the past two years daily attacks of severe left-sided headache, with what she described as flashes appearing in her left eye. These attacks lasted for about five minutes, coming on without any apparent regularity during the day, and without any cause ascertainable on the part of the patient. Furthermore, they had not changed whatever in severity. Very naturally the young lady was very nervous and more or less incapacitated on account of the attacks. She was under the care of Dr. Post for some time, but treatment directed to her eyes and her general condition was without avail. In the hope that something might be found in the nose to account for the symptoms, she was referred to me. She presented no special nasal symptoms except that of sneezing, which she stated had been noted since she was a small child. She had had no headaches except as already specified. Family and other personal history good.

Examination of right nasal cavity showed nothing abnormal except some enlargement of the middle turbinate. On the left side there was a marked hypertrophy of the middle turbinate, the inferior being normal, and the septum not deviated.

There was evidently a chronic ethmoiditis on the left side. Since this corresponded to the side on which the symptoms were declared, it was decided to remove the anterior end of the middle turbinate and to curette the ethmoid cells, although no promise of relief was given. The process was more extensive than I had foreseen, thickened mucous membrane without pus being found in most of the cells, and the anterior end of the middle turbinate being virtually an ethmoid cell of the type of a concha bullosa. An extensive exenteration was therefore undertaken. The patient suffered from a very mild attack on the day of the operation, but since that time, now nine months, she has not had a single attack.

So far as I have been able to find, no report has been made of a case of scintillating scotoma relieved by operation on the nose. In fact, there seems to be no disposition on the part of the writers to associate it with disease of the accessory sinuses. Wilbrand and Saenger,[1] who have written extensively upon the various forms of scintillating scotoma, say that little is known of its origin. They quote the following as to its etiology: "Moebius claims that in ninety per cent of the cases a neuropathic disposition is demonstrable. According to L. Mayer and Ricchi, the attacks frequently occur at menstruation, and according to Strehl, the condition is brought about by puberty in one who has an hereditary predisposition. Antonelli holds that there is a relation between scintillating scotoma and neurasthenia, hysteria, epilepsy, tabes and progressive paralysis. Most authors look upon the condition as a form of migraine, and ascribe to each the same etiology."

In my case it might be claimed that the operation was no more effective than any other form of operative or suggestive treatment. Admitting such a possibility, we must still take into account the extensive pathologic condition present on that side of the nose, and absence of any promise of relief at the time of the operation.

At any rate, attention to the accessory sinuses in any similar condition will do no harm, and may meet with an equally satisfactory result.

Finally, these two cases bring again into our field of study the observation which was made in my paper on "A Study of the Anatomic Relation of the Optic Nerve to the Accessory Cavities of the Nose,"[2] that under ordinary circumstances the optic nerve is in close relation with the ethmoid labyrinth only at the posteroexternal angle of the last posterior ethmoid cell. Where this relation exists, there is only the slightest possibility of any danger to the optic nerve in suppuration confined to the ethmoid cells. But when the last posterior ethmoid cell replaces the sphenoid, the optic nerve runs close to and along the external wall of this ethmoid cell (as in two out of thirty specimens studied), and the vulnerability of the nerve is correspondingly heightened, in view of the greatly increased portion exposed.

Without being able to demonstrate it, I feel that this is the relation of the posterior ethmoid cell to the optic nerve in the case of blindness reported, confirmed by the history and course of the disease and the rapid restoration of vision following exenteration of the ethmoid cells.

REFERENCES.

1. Wilbrand and Saenger: Die Neurologie des Auges, Vol. 3, part 2, 1906.
2. Loeb, H. W.: Annals of Otology, Rhinology and Laryngology, June, 1909.

LXIV.

THE CLINICAL SIGNIFICANCE OF BACTEREMIA.*

By J. E. Sheppard, M. D., F. A. C. S.,

Brooklyn.

Having been asked by our secretary to write upon this subject, I feel like confessing that the title has a distinctly more pretentious sound than the paper warrants. My efforts will be limited to a report of four cases, which have seemed to be fairly illustrative of a considerable series of cases met with by my associate, Dr. Stickle, and myself in our work at the Jewish Hospital of Brooklyn, together with a few deductions drawn therefrom.

Case 1.—Rosalie M., seven years old, was admitted to the Jewish Hospital, August 27, 1913. She had an attack of measles late in the preceding June, followed by an acute suppurating right ear, and on July 17th I opened the mastoid, finding nothing particularly out of the ordinary. No unusual symptoms developed until about August 12th, when, with chilly sensations and vomiting, the temperature rose to 104°, and some fetid pus was found blocked up in the tympanic cavity and antrum. These symptoms continued with more or less severity until her admission to the hospital on August 27th, on which day Dr. Stickle, in my absence from the city, did a further operation. The sinus was opened with resultant free bleeding, no thrombosis being found.

The sinus blood was cultured, no growth occurring until two days later, when there were numerous colonies of the streptococcus longus. This was followed by a period of daily chilliness, fever and sweats, lasting until September 22d, after which the temperature remained flat and further recovery was uneventful. From a culture taken September 13th the blood was reported sterile.

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*Read before the American Laryngological, Rhinological and Otological Society, Atlantic City, June, 1914.

Repeated blood counts showed the following results:

	Leucocytes.	Polymorphonuclears.
August 27th	10,400	86%
August 29th	14,000	74%
September 4th	22,000	80%
September 9th	20,000	89%
September 12th	12,000	66%
September 15th	10.000	65%

Repeated urine examinations gave negative results throughout. For a considerable period she was given five grains of urotropin every four hours.

On September 1st and 2d she was given a mixed streptococcus vaccine. On the 9th, 13th, 16th and 19th she was given an autogenous vaccine.

At the time of the second operation the child presented a strongly septic appearance and there seemed no doubt about the need of opening the lateral sinus. Although no thrombus was found, it seems more than probable that the blood infection occurred at this point.

Case 2.—H. L., aged forty-four years, male, was admitted to the Jewish Hospital, November 2, 1910, when he had given the following history: Four months ago, with a severe head cold, he developed a severe headache, the pain later localizing in the left ear, but was gone within twenty-four hours, a troublesome tinnitus remaining. The earache returned at intervals, there having been a particularly severe attack just before he came to the hospital.

Examination on the day of admission, November 27th, showed receding acute otitis media, without perforation; there was pus coming from the left frontal sinus, which, however, was not tender even on deep pressure, nor had he complained of pain in that region; there was no pain in the ear and no mastoid tenderness.

Temperature on admission was 104°. On November 4th and 7th Widal reaction was negative. A blood culture taken on the 6th showed streptococcus mucosus capsulatus; another on the 12th the same, twenty-four colonies to the cubic centimeter; November 14th the same, 142 colonies to the cubic centimeter; November 18th the same. On this date the agglutination reaction, in a dilution of 1 to 800, was strongly positive; in one of 1 to 16,000, was negative. November 24th another blood culture, ten cubic centimeters of blood distributed among five plates and two flasks, was sterile.

Blood counts showed the following:

	Leucocytes.	Polymorphonuclears.
November 2d	13,800	74%
November 3d	13,000	85%
November 4th	11,000	83%
November 16th	17,800	77%
November 17th	14,000	73%
November 18th	16,000	76%
November 19th	13,000	70%
November 20th	9,600	65%
November 21st	10,600	75%
November 22d	7,000	54%
November 23d	6,000	73%
November 24th	9,200	77%

The urine examinations were negative throughout.

The patient was not operated, and received no vaccine treatment. He left the hospital, contrary to advice, November 25th, but was obliged to return within the next two or three weeks with two or three metastases, not serious clinically. The same organism, the streptococcus mucosus capsulatus, was found in all metastases.

Case 3.—Samuel Z., aged seven years, was admitted to the Jewish Hospital, April 27, 1914. The present illness began April 11th with headache and pain in the left ear, and temperature of 106°. No cough, no vomiting, no convulsions. There was not at that time, nor has there been since, any discharge from the left ear. Under treatment the temperature gradually subsided, rising to a high degree again on the eighth day, when there was slight rigidity of the neck, slight Kernig, and twitching of the eyes. On April 21st he was seen at the dispensary of the Jewish Hospital, when there was again a high temperature; the left drum membrane was congested; the cervical glands on the left side were enlarged. The temperature subsided under treatment, but was high again on the 24th, since which time there have been chills every afternoon.

followed by high temperature. Widal negative. On admission, April 27th, temperature was 99.8°.

Examination of ears by Dr. Stickle showed right membrana tympani normal; left membrana tympani almost subsided acute otitis media (nonsuppurative); two or three very slightly enlarged glands along the anterior border of the sternomastoid muscle; no mastoid tenderness.

Blood examinations showed the following:

	Leucocytes.	Polymorphonuclears.
April 27th	15,000	82%
April 29th	32,600	80%
May 3d	18,000	87%

April 28th: Blood culture sterile.

April 29th: Cerebrospinal fluid, 25 cc. under moderate pressure; clear, numerous fine flocculi; 1 mm. albumin ring; Fehling's reduced; globulin negative. Cytology: A few lymphocytes.

May 1st: Eye grounds negative.

May 2d: The medical side having excluded all other probable causes of high temperature, requested an exploration of the lateral sinus. Operation was undertaken by Dr. Stickle.

A small antrum was found, containing a small amount of coffee colored mucus (not even mucopus) and no granulations; the bony walls of the antrum were intact throughout; the floor of the antrum consisted of the wall covering the knee and adjacent portions of the sigmoid sinus. The latter was exposed from where it turns inward towards the bulb to a considerable distance back of the knee, and was not pulsating. Upon opening the sinus there was found a large thrombus, broken down and containing pus centrally, and extending from the torcular to the bulb. From the latter direction only a slight return flow was obtained, while it was well washed out from the torcular end. The pus from the thrombus showed streptococcus longus. Culture of blood, taken immediately after operation, developed a hemolytic streptococcus, six colonies to the cubic centimeter.

May 6th: Blood culture showed streptococcus longus, three colonies to the one-half cubic centimeter.

May 25th: Blood culture sterile.

Temperature practically flat from May 9th, and recovery uneventful. No sera or vaccines used. Urine negative upon repeated examinations.

Case 4.—Edward J., aged four years, was admitted to the Jewish Hospital, April 27, 1914. Present illness began four weeks ago with an attack of grippe, with a resultant acute otitis, for which the right drum membrane was incised three weeks ago at the Postgraduate School in New York City, followed by hot irrigations.

There was a low grade temperature until four days ago, when he had a chill, and since then high fever continuing, but fluctuating; was very restless, had headache. Three days ago developed pain in right leg; not localized, but whole leg seems tender to the touch, and he does not move it. There were no pulmonary symptoms, no urinary trouble, but he was very constipated.

On admission, examination by Dr. Stickle showed both drum membranes normal, and no mastoid tenderness. Temperature was 101.4°.

On April 30th in right drum membrane a small hemorrhagic area appeared, but no evidence of inflammation. Same day eye grounds negative.

April 28th and May 1st X-ray showed no trouble with the bones around the hip joint.

Urine examinations were as follows:

April 28th: Negative.

May 13th: A trace of albumin; loaded with white blood cells and bladder epithelium.

May 29th: Faint trace of albumin; no white blood cells or epithelium.

Blood examinations showed the following results:

	Leucocytes.	Polymorphonuclears.
April 28th	20,000	91%
April 29th	17,000	77%
May 9th	8,600	66%

Blood cultures gave the following results:

April 28th: Streptococcus brevis.

May 1st: Streptococcus brevis.

Map 6th: Sterile.

May 12th: Culture sterile. Same date, cerebrospinal fluid, slightly bloody specimen; 2 mm. albumin ring; Fehling's reduced; globulin negative; blood cells; bacteriology, negative.

May 12th: Drum membranes negative. Recovery from then on uneventful.

These two cases (3 and 4) entered the hospital the same day; neither of them had on admission sufficient ear symptoms to appear specially significant.

Case 3, the operated case, did not have a bacteremia until the day following his operation. Case 4, the case that was not operated, had a bacteremia on admission.

Case 3 on admission had a leucocytosis of 15,000, with a polymorphonuclear count of 82 per cent, going up in six days to 18,000 and 87 per cent.

Case 4 on admission had 20,000 leucocytes and 91 per cent polymorphonuclears; going down in three days to 17,000 and 77 per cent; and in eleven days to 8,600 and 66 per cent.

Case 3 on admission appeared gravely septic. Case 4 did not to nearly as great an extent.

Finally, case 3 needed operation, case 4 evidently did not.

In closing, these cases and others of the group of which these are a part would appear to demonstrate that not all cases of otitic bacteremia need operation.

To distinguish between those cases that do and those that do not require operating would seem to call for our closest observation and best judgment.

As aids to us, often all too meager, it is true, in coming to a conclusion whether or not to operate, I would suggest the following:

1. The general condition and appearance of the patient. Is there a markedly septic condition? Is it increasing or decreasing? And, as of course the greatest aid in determining this,

2. The temperature curve.

3. Whether the process is localizing or tending to become general (if metastases are occurring, etc.).

4. Blood counts frequent enough to keep a careful line on the patient's resisting power.

5. Blood cultures sufficiently often to have a definite knowledge of the persistence of the organism in the blood, and whether the number of colonies per cubic centimeter is increasing or diminishing; thus showing whether or not the patient is in need of assistance in taking care of the bacteremia.

I cannot close without an acknowledgment of my obligation to my associate, Dr. Stickle, who did much of the work, both clinical and other, in connection with these cases, and to our Jewish Hospital pathologist, Dr. Simon Blatteis, whose superior knowledge and judgment of certain phases of most all of the cases has always been at my disposal.

LXV.

A CASE OF SEPTIC INFECTION OF THE PAROTID GLANDS RESULTING FATALLY.*

By F. E. Hopkins, M. D.,

Springfield.

Lesions about the mouth are so often brought to the attention of the laryngologist, that a brief report of what must be a rare case of this character is worthy of record. The parotid glands, because of their size, importance and anatomic relation to nerves and large blood vessels, afford possibilities of serious complications, and a case of infection of these glands is the subject of this report.

A review of some of these relations to other structures makes for a clearer understanding of the results which may follow serious lesions of the parotid. The gland has three large lobes. The third, or most deeply placed, passes behind the styloid process, and beneath the mastoid process and sternomastoid muscle, coming in contact with the internal jugular vein and the internal carotid artery. From the relation which this carotid lobe holds to the internal jugular vein, it follows that swelling of the gland may cause passive congestion of the brain by compression of that vein. The following structures are found to traverse or to be in intimate relation with the gland: The facial nerve, the temporomaxillary, superficial temporal, internal maxillary and posterior auricular veins; the commencement of the external jugular vein; the external carotid artery which supplies branches to the gland and divides into its two terminal branches—the temporal and internal maxillary arteries; and the terminal part of the great auricular nerve. The posterior auricular branch of the external carotid artery and the transverse facial branch of the temporal artery arise within the substance of the gland. The gland is separated from large vessels and from the pneumogastric, glossopharyngeal and hypoglossal nerves by a thin layer of fascia.

The quotation from anatomic authority illustrates the difficulty of complete removal of the gland, or even of thorough incision to secure complete drainage in case of septic infection. The structure of the salivary glands, too, explains something of the difficulty met with in an attempt to drain by incision, in case of closure of the intralobular ducts, for the salivary glands are of the compound tubular variety, made up of lobules, each lobule consisting of the branchings of a subdivision of the main duct.

Now, in a case of involvement of the entire gland, if we consider each of the great number of the intralobular ducts as occluded by an exudate, the problem of securing perfect drainage is seen to be a difficult one.

Through the courtesy of Dr. Goodell of Springfield, who was about to leave for his summer vacation, I saw on July 1, 1913, B., male, fifty-four years old, who was suffering from an infection of both parotid glands. The cause, or why the development should start as a symmetrical one, is not clear, and was probably due to some unusual sepsis.

There was but slight rise of temperature and little acceleration of the pulse. Though worn to the point of exhaustion by heavy business cares, he kept himself at work, complaining principally of symptoms due to obstruction of Steno's duct, of the great, unsightly swellings at the angles of the jaws, and of mental heaviness and depression. Dr. Goodell had succeeded in probing the duct of the left parotid, and this gland was less swollen than the right, the duct of which had not been entered.

After several trials I succeeded in passing a probe through the right duct down to the gland, and a few drops of thick mucopus drained away, but the inflammatory process in alveoli and ducts had evidently continued too long to permit of adequate drainage through the duct. Imperfect as was the drainage gained by probing, the slight easing of pressure brought a measure of relief. The patient was prevailed upon to drop his business and enter a hospital; and though there were intervals of temporary improvement corresponding to the measure of drainage secured, on the whole the case did badly. The temperature rose to 102° at night with morning remissions, but this mild curve did not correspond to the gravity of the process going on.

On July 18th, Dr. Dudley Carleton, a surgeon, saw the case in consultation with the family physician and myself, and in an effort for better drainage made deep incisions into both glands. From the tense tumor a free flow of fluid might have been expected; but there was only a moderate discharge of thick mucopus exuding from those lobules entered and no diminution of the general swelling. These incisions proved as ineffective as a means of drainage as had probing the ducts. Why these limited incisions failed is seen by recalling the anatomy of the gland and the pathology of the process taking place—the many lobules opened were, in fact, but a small fraction of the entire gland, and the great majority of the lobules still remained undrained because of the closure of their ducts.

Some of the patient's symptoms, particularly the mental heaviness and depression, seemed to confirm the suggestion presented in the anatomic relation of the gland to the internal jugular vein, the great swelling of the gland compressing this vessel and causing cerebral congestion. The mental symptoms certainly were not due to sepsis.

The patient died of exhaustion July 30th.

If a lesson as to the care of septic infection of the parotid gland is to be drawn from this case, the first suggestion is for early attempts to drain by dilatation of the duct, together with efforts to reduce the inflammation of the gland. If such care can begin before the intralobular ducts are closed, the outcome should be favorable. This failing, the glands may be dissected out by a skillful surgeon; and while facial paralysis and much inconvenience from loss of the secretion of the gland must result, the best interests of the patient will be conserved.

LXVI.

TWO CASES OF EXTENSIVE FIBROMYXOMA OF THE NASOPHARYNX.*

By John Edwin Brown, M. D.,

Columbus.

Few of the various types of tumor of the nasal passages or nasopharynx are so rare as to make their cases of interest merely because of the pathologic group to which they belong. But the location, extent, relation to surrounding tissues and secondary attachments, may make any case of interest from the surgical questions it puts to the operator. These cases are reported because of the surgical difficulties they presented to me.

Case 1.—Male, age seventeen years. The family history was negative on the father's side. The mother, age thirty-five years, suffered from an exophthalmos of the left eye, associated with unilateral choked disc and a central absolute scotoma. A sister of the mother gave symptoms of inherited specific disease. The mother was under observation, taking large doses of potassium iodid, when the son was first brought to me. He was sent in by his family physician, Dr. C. A. C., prepared for a tonsil-adenoid operation which the local conditions plainly indicated. The operation revealed, in addition, an extreme deviation of the septum to the right, which was corrected by operation two weeks later. His right nasal stenosis was thought to be due to this until manipulations during operation revealed a mass projecting from lateral wall of posterior nares apparently directly back of the middle turbinate. It was dense in consistency and gave no free or pedunculated portion for easy surgical attack. The snare was tried unsuccessfully then and on two subsequent occasions, though small masses were secured for the pathologist. March 26, 1908, the inferior turbinate was removed to give better access to the growth. April 8th, under local anesthesia, a loop of No. 5 wire was passed through the nasal passage, attached to a snare with an extra heavy canula so that the loop encircled that portion of the tumor on the wall of the nasopharynx. The forefinger of one hand was used to keep the wire pressed as closely as possible to the wall of the pharynx as the loop was tightened. It was my original intention to snare off as much of the growth as the loop would engage, and then similarly attack the remaining portion of the growth. As the wire was drawn home it was realized how firmly it was imbedded in the tissue. I decided, therefore, to make traction on the loop and use my finger in the nasopharynx to act as a blunt dissector to aid in separating the tumor from its attachments. The reward was a separation of the tumor in its entirety from its attachments, and its withdrawal—somewhat difficult—through the anterior naris. The only laceration of the surrounding tissues was of a small strip of ethmoidal mucosa which came out with the tumor. The tumor itself was oblong, fifty-five millimeters in length, and twenty-two millimeters in width. Its consistency was that of an ordinary fibroma. The hemorrhage after removal was slight, and there was no surgical shock. The patient has remained entirely well since its removal (five years ago).

Case 2.—G. J. H., age eighteen years. Family history good; father and mother, both paternal and maternal grandparents, all living and healthy. He was referred to me by Drs. Crotti and McKenzie. He had the facial appearance of tonsil-adenoid disease, and had undergone, at the hands of a competent rhinologist, an operation for removal of tonsils and adenoids, and later a second operation under local anesthesia for a condition diagnosed as "polypus." Subsequent to the first operative procedure a slight swelling that had appeared in the right cheek had increased in size, and coincident with this, obstruction to the passage of air through the right nostril had become marked until at the time of his visit it was possible for the patient, by closing the opposite side, to aspirate only a trifle of air through the nostril, while none whatever could be forced outward. Only a short time before, a surgeon of his home town had attempted an external operation on the swelling in the cheek. The operation was discontinued without removal of any tissue, on account of hemorrhage and poor condition of the patient.

Examination disclosed a tumor mass which occupied the posterior third of right nostril, was confluent with its outer wall, and had become adherent to septum where in contact with this posteriorly. A probe could be passed along the floor of the nostril into the nasopharynx. By posterior rhinoscopy this mass could be seen high in the vault and well to the side, affording no projecting or pendulous portion. The swelling in the cheek was evidently due to the growth outward through the sphenomaxillary fossa of a tumor, presumably the same as occupied the posterior nares. The boy's condition was rapidly growing worse. His physician stated that he seriously collapsed in the recent operative procedures. It was deemed unwise to attempt anything that did not promise the entire removal of the growth, and I advised approaching the tumor through the canine fossa and maxillary antrum. Under ether this operation was begun. The antral cavity was free from growth, but its posterior bony wall had disappeared, and in this region was a dense mass continuous with the tumor in posterior nares and apparently with the mass in the cheek. It was difficult by dull dissection to free the mass from its attachments so that it could be grasped by strong forceps, and in the process a number of smaller masses were torn away from the tumor. The postnasal space had been plugged from below, but the hemorrhage was free and the patient's pulse showed profound collapse so that ether was withdrawn and oxygen alone used during the latter part of operation. The tumor was finally evulsed. It apparently had occupied the space of the posterior ethmoidal cells, sphenoid sinus, the sphenomaxillary fossa, and to a limited extent encroached on the space of the maxillary antrum. After packing, the patient was in serious collapse and pulse was not perceptible at the wrist. Dr. Crotti made transfusion of seventy cubic centimeters of blood from the father to the patient by the indirect method he usually follows. Oxygen was used for twenty-four hours, together with a large amount of strychnin and atropin. At the end of this time he showed signs of rallying, and from that went on to recovery. At this time he is in the best health he has had for several years, and examination shows no evidence of a return of growth. The region occupied by the tumor has healed, leaving, however, the sphenoid, posterior ethmoid, and maxillary cavities confluent with the nasal passage.

The pathologist's report stated that this tumor was identical in nature with the first—namely, a fibroma of myxomatous character. Some uncertainty had attended the report on the sections from small specimens removed in the first case, but when one was obtained that was definitely from the tumor there was no doubt as to its benign character. Dr. J. J. Coons of Columbus made the pathologic report, confirmed in the first case by Dr. Bloodgood of Baltimore.

[Note.—In December, 1913, case number 2 reappeared with the history of having had several severe hemorrhages. Examination revealed a soft elastic mass in the region of the face of the sphenoid and the adjacent lateral wall of the nasopharynx, from which there was a pulsating flow on puncture with needle. Local anesthesia was applied, and after preparations for checking hemorrhage were made, the snare was used to remove a small mass for examination. The wire cut through the tissue without resistance and a profuse hemorrhage ensued. Before the packing, which was at hand, could be inserted, probably one and one-half pints of blood had been lost. A specimen was not secured. Later attempts at removal of packing during the next four weeks were always followed by profuse hemorrhage. January 1st the common carotid on that side was ligated, but without effect. The packing was then left in place and removed only when indications of decomposition appeared, the bottommost part being never entirely removed until the latter part of March, when but slight oozing took place. At the last dressing there was no hemorrhage. The patient has not been seen now for one month. There is no indication of malignancy, either locally or by metastasis.]

LXVII.

A CASE OF PAPILLOMA OF THE LARYNX TREATED BY RADIUM.*

By F. E. Hopkins, M. D.,

Springfield.

The subject of papilloma of the larynx in children was thoroughly discussed by this association in 1905. Dr. Clark's exhaustive paper grew out of a large experience with these most serious cases, and his conclusions furnish a prudent and intelligent basis for the care of this disease in children. Notwithstanding the peril to life from suffocation, and the tendency to rapid recurrence after removal, the natural history of the development of these growths is such that a measurably favorable prognosis is warranted. This favorable element is due to the fact that when the period of the child's active growth has passed, the papilloma may disappear spontaneously, or no longer recur after thorough removal; and Dr. Clark states briefly and positively that the best method of treatment is tracheotomy and noninterference with the growth.

Now, the case of the adult suffering from papilloma of the larynx may be far more desperate than that of the child, for he can look forward to no period of cessation of activity in the development of these cells, and rapid recurrence may be the rule. The grim, persistent and unchanging course sometimes run is illustrated in a case reported by Dr. Robert Abbe in the *Medical Record* of April 13, 1912. This case had been under the care of Dr. W. L. Culbert of New York, who with cutting forceps had repeatedly cleared the woman's larynx of masses of papillomata. This case was a legacy to him from Dr. Lincoln, who had done the same, and who only continued to do what had been done by Dr. Elsberg—surely this patient was wise in her choice of laryngologists. The picture of this larynx stuffed with warty growths was published by Dr. Elsberg in his report of the case appearing in the transactions of the American Medical Association for 1865.

Bringing the history of the case down to 1912, as noted above, the patient's larynx had been cleared out every six months for over forty-seven years—a comment on the tendency, or lack of it, of these warty growths to take on malignancy when repeatedly operated upon.

A case similar in character, though less severe in degree, is that of Mrs. C., fifty years of age, who recently came under my observation through the courtesy of Dr. J. L. Barton of New York. Mrs. C. was operated upon for the removal of papilloma of the larynx seventeen years ago. Tracheotomy was done at that time and an ounce of papillomatous tissue removed. She has been operated upon repeatedly since, and the snare, forceps, curette, actual cautery and monochloracetic acid have all been used. Tracheotomy has been performed seven times during this period of seventeen years.

These obstinate cases are referred to as illustrating the serious problem that some of them present, and because both of these have recently been treated by radium. Mrs. C.'s treatment was by Dr. Abbe on December 23, 1913. Dr. Abbe also treated the first named case. A tracheotomy was done under ether and radium, applied directly to the larynx for a period of forty-five minutes. The growths disappeared and the tracheotomy wound was allowed to close at once, and for a time breathing through the larynx went on reasonably well. Narrowing, however, occurred, and to such a degree that tracheotomy again became necessary and was done April 5th. At this time no growths could be seen in the larynx, its narrowing being due to adhesions through the anterior three-fourths. In fact, the opening remaining was so small it seemed incredible that sufficient air to sustain life could pass. An explanation of this cicatricial contraction which has been offered is that former treatment by acids, cautery, etc., is responsible. At this date a narrow ring of grayish growths can be seen on the under side of the opening in the larynx—a recurrence of the papillomata—and the adhesions within the larynx may be due to burns by radium. If this latter is chargeable to radium, then caution must be exercised in its use, and the recurrence shows the need of repeated applications.

Those who have used radium are claiming that a cure of papillomata of the larynx can be effected by its use. If this happy result may be reached, and by a method which does not injure the larynx, a boon will be conferred alike on patient and on surgeon. I offer this brief note, hoping your discussion may help to make clear the possibilities of the new agent. Is it to bring about a cure, or, like the uncertainty of surgery, give but temporary relief; and is it also capable of doing damage to the larynx itself by burning and subsequent cicatricial contraction?

SOCIETY PROCEEDINGS.

TRANSACTIONS OF THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY.

Meeting at Atlantic City, June 19 and 20, 1914.

SYMPOSIUM: STENOSIS OF ESOPHAGUS.

(a) Anatomy, Anomalies, Instruments and Technic.

Dr. Harris P. Mosher, Boston, after discussing briefly the comparative anatomy of the esophagus, considered the esophagus in man under the following subheads: (1) Congenital anomalies; anatomy; structure; lymphatics; position; direction; diameter; length; distensibility; subphrenic portion; movements; appearance of normal esophagus. (2) Physiology; function; peristaltic action; respiratory movements; innervation.

He then discussed the contraindications to esophagoscopy. The only contraindications to the performance of esophagoscopy are acute inflammation, as after the swallowing of corrosive fluids, and aneurism of the aorta. The chief danger in passing the esophagoscope is rupture of the esophagus, which almost alway results in infection of the posterior mediastinum and death. Such an accident can be easily avoided by the selection of a tube of the proper size and by adhering to the fundamental axiom of all esophageal examinations, namely, the examining tube must never be advanced unless the eye sees through the tube the open esophagus ahead. It should be remembered, also, that in old people the esophageal wall may be thin enough to rupture itself, so that smaller tubes and greater care in using them are necessary. It has developed of late years that there is considerable shock from manipulations carried out in the esophagus, more shock than is caused by working in the trachea and bronchi. Children bear esophageal examinations less well than do adults. In poorly nourished patients, particularly those who are on the point of starvation from the presence of a stricture, it is better practice to open the stomach and feed the patient through a gastric fistula until his resistance has been restored, before attempting any prolonged examination.

The esophagus may be examined under local or general anesthesia, the author being strongly prejudiced in favor of general anesthesia, doing most of his esophageal work with ether.

The laryngologist, on beginning esophageal work, should supply himself with a full set of general and special instruments, a full list of which is recommended in the paper.

A general physical examination of the patient should be made before esophagostomy is attempted. An X-ray plate is indispensable before many examinations. It shows the location of metallic foreign bodies, pieces of bone, and buttons; it shows enlargements of the arch of the aorta and enlargement of the mediastinal glands, and, combined with the ingestion of bismuth, it shows the position of strictures, the size and location of diverticula, and the size of the dilated esophagus.

The technic of esophagoscopy under local and under general anesthesia is described in detail.

(b) Causes, Symptoms, Pathology, Diagnosis and Treatment.

Dr. Chevalier Jackson, Pittsburg: Stenosis of the esophagus may be classified as inflammatory, neoplastic, compressive, spastic, and angioneurotic.

The inflammatory stenoses may be edematous or cicatricial; the neoplastic, benign or malignant. The compressive may be due to malignant, benign or inflammatory, or periesophageal lesions, or to aneurism or enlargement of the left auricle. Compression stenosis is also frequently caused by a pulsion diverticulum of the esophagus itself when the pouch is full of blood. Spastic stenoses are usually seen at the cricordal level, due to spasmodic contraction of the inferior constrictors, especially the orbicular fibers, along with the adjacent orbicular fibers of the esophageal wall. The next most frequent spastic stenosis is at the hiatus, the contraction being due to the traction of the diaphragmatic musculature and the small bundles of fibers given off from the diaphragm and attached to the esophagus. Angioneurotic edema producing severe stenosis of the esophagus has been observed by Arrowsmith.

The etiology varies with the character of the stenosis. Inflammatory stenoses are most frequently caused by swallowing corrosives, but they may be due to stasis of food halted by spasmodic stenosis. Other causes are the traumata of foreign bodies, the mixed infections associated with lues and with tuberculosis of the esophageal wall.

The cause of neoplastic stenosis, like that of neoplasms elsewhere, is unknown. Inflammatory processes and their end results probably contribute to the etiology by affording a favorable soil.

Spastic stenosis may be local or general. Local stenosis is often the result of a "vicious circle" started by rapid eating, with its associated gulping of large boluses of illy masticated food, followed by stasis of the food, inflammation and erosion, which, in turn, serve as a source of reflex excitement of more frequent and prolonged spasm, this inflammatory process being thus increased. The general causes of spastic stenosis are dependent upon some basic nerve disorder, probably more functional than organic.

Pulsion diverticulum, as demonstrated by Killian, is chiefly caused by insufficient support of the esophageal wall between the fundiform and oblique fibers of the inferior constrictor.

Extensive consideration of the symptomatology is useless, inasmuch as any abnormal sensation whatever, referable to the esophagus, is an indication for esophagoscopy, by which, rather than by symptoms, the diagnosis is to be made. An otherwise altogether unaccountable cough, "globus hystericus," and the filling to overflowing of the pyriform sinuses with secretions, are some of the signs which may lead to the diagnosis of esophageal stenosis.

Radiography is of the greatest usefulness in demonstrating the size and extent of dilatation and diverticula, as well as assisting in making the diagnosis of their presence. Fluoroscopy affords very important aid by determining the functional activity of the esophagus during the act of swallowing. Taken alone, however, these means may lead to error.

The bougie, passed bindly, is of no use for diagnostic purposes. The differential diagnosis of lues, tuberculosis, and malignancy is made by exclusion and by biopsy. The other types of stenosis are diagnosticated by characteristic signs, which are detailed by the author.

Treatment should never be instituted while the patient is in the condition of water starvation. Enteroclysis or hypodermoclysis should be begun immediately. Immediate gastrostomy by the general surgeon, preferably under local anesthesia, should be performed when the patient has had little or no water for as much as four days.

Edematous inflammatory stenoses are best treated by the swallowing by the patient of small doses of bismuth with a little calomel, both given dry on the tongue.

Cicatricial stenoses, in the author's experience, are best treated by filiform silk woven bougies passed esophageally.

Benign and endoesophageal growths are probably readily removable, though they are so rare that accurate data are lacking.

Malignant stenoses of the esophagus are regarded by general surgeons as inoperable. There is reason to hope, however, that, when early diagnosis is possible, transthoracic esophageal resection may be a justifiable procedure.

Spasmodic stenoses are best treated by divulsion. For this the author prefers a mechanical divulsor, such as that of Mosher, placed by sight through the esophagoscope.

The treatment of compressive stenoses obviously depends upon the nature of the compressive mass.

Pulsion diverticula, according to the consensus of opinion, steadily increase in size and severity of symptoms, consequently amputation of the sac by the surgeon, operating through the neck, is indicated. The operation with esophagoscopic aid devised by Dr. Otto C. Gaub has been successfully employed by the author in two cases. This method is described and illustrated with three figures.

DISCUSSION.

Dr. Ross Hall Skillern, Philadelphia, recommended the Schwebe laryngoscope, which, with the suspension apparatus, gives a technic as simple as the passing of a nasopharyngoscope into the nose. With the tongue depressor and the apparatus for lifting up the larynx, the pyriform sinuses and the upper part of the larynx could be shown completely, without lifting the cricoid cartilage entirely. The instrument was fitted with a double light. The tube was passed as one would pass the nasopharyngoscope, and slipped down below the cricoid cartilage. By comparing this with the other method he had found it the simpler. He could see directly into the larynx. Children, as a rule, stood the esophagoscope badly, but under the Schwebe or suspension apparatus they would stand for hours, or as long as necessary. He had had no child, thus far, to "go bad" with the Schwebe in position.

Dr. Sidney Yankauer, New York City, recounted an experience with a stricture at the cardiac end of the stomach. The patient had suffered for many years from cardiospasm, and many attempts had been made to dilate the cardia, all without the slightest effect upon the cardiospasm. The man was unable to swallow other than liquid food, most of which came back into the mouth. He finally came into the hands of Dr. Willy Meyer, who, in the differential pressure chamber, opened the thorax, found the dilated portion of the esophagus, which he corrected by plicating, but without improvement. The patient was put in the chamber again and an operation similar to Mikulicz's pyloroplasty performed on the cardia through the chest wall. There resulted not the slightest improvement in the swallowing or the cardiospasm. Dr. Meyer then turned the patient over to him to see what could be accomplished with the esophagoscope. Upon putting in the 'scope the scar tissue from the plications could be seen, forming ridges at the anterolateral portion of the cardia; beyond this, a bend of the lumen was located at the cardia, which it was impossible to pass. The lumen of the cardia was merely a slit. Attempts to pass through this brought so much pressure to bear upon the sides of the esophagus that it was impossible to proceed. To pass and straighten out this tissue was a problem. He made for the purpose a wire probe which consisted of small joints, about a quarter of an inch long, so constructed that it would bend in one direction, but could not return beyond a straight line. His idea was to use the curved part to go round the ridge to rotate the instrument and then to pass the straight part into the stomach. After several attempts he finally succeeded in straightening out the ridge and in passing a narrow tube beyond the ridge.

He then saw what seemed to be a string coming out from the lumen of the cardia. It proved to be a silk suture from the cardioplastic operation. Subsequently he found another stitch which he cut and removed. Following the removal of these two stitches the scar tissue softened up considerably, after which the gastroscope could be passed. After this the patient could swallow liquid food without difficulty, and some semisolid food. He then passed the gastroscope and manipulated the head and shoulders in an effort to loosen up the cicatricial tissue. The patient's condition improved to such an extent that he could swallow gruels and semisolid foods, but not solid food.

The case illustrated what could be accomplished by the exercise of patience and a certain amount of resourcefulness.

Dr. Samuel Iglauer, Cincinnati, described a procedure employed in the treatment of a case of complete obstruction of the esophagus following typhoid fever, occurring in a boy about ten years of age. A gastrostomy had been performed, through which the patient had been fed for a number of years. In order to measure the thickness of the obstruction an olive tipped bougie was passed from the stomach into the esophagus and another was passed through the mouth and the distance between the two olives was determined by an X-ray picture. The olives were found to be slightly overlapped and about one-sixteenth of an inch apart.

Esophagoscopy, both from the oral and the stomach end of the esophagus, failed to reveal any fistulous tract through the obstruction. A few days later, working in conjunction with Dr. Murphy, of Cincinnati, an attempt was made to relieve the obstruction by an original method. An esophagoscope was introduced through the stomach end of the esophagus and at the same time a second esophagoscope was introduced through the oral end. Both tubes were introduced as far as the obstruction, there being an observer for each instrument. When the light in one instrument was turned out the glow of the light in the other could at times be seen transilluminating the obstruction.

With an electrocautery an attempt was then made to burn through the transilluminated diaphragm from above. The cautery was followed by a slender bougie which apparently passed through, but digital examination showed the bougie under the mucous membrane in the stomach. The bougie had evidently dissected up the mucosa of the esophagus and passed down into the stomach wall. After a few days the patient was removed from the hospital, contrary to advice. While on the train on his way home he began to swallow naturally, and this continued up to the time of his death, which occurred about three weeks after the operation. Evidently the lumen of the esophagus had been restored, and if the procedure outlined above was followed more cautiously it would prove more successful.

Dr. George F. Cott, Buffalo, added a third condition to the two mentioned by Dr. Mosher in which the ophthalmoscope could not or should not be passed. He cited a case in which the patient could not swallow, and in whom, under ether, the esophagoscope could not be passed, after strenuous efforts for some time. Upon further investigation it was discovered that there was ankylosis of the cervical vertebræ from syphilis.

Dr. G. Hudson Makuen, Philadelphia, asked if Coley's fluid (mixed toxins of bacillus prodigiosus and streptococcus erysipelatosus) had been tried in malignant disease of the esophagus. Many cases of marvelous cures have been reported, not only by Coley himself but by other distinguished surgeons in this country and abroad, and it would seem that, unless there were some contraindication against its use, it might prove to be quite as efficient, if not more so, than any of the other methods which have been suggested, not excluding radium. He had had the pleasure recently of talking with Dr. Coley about the preparation of the "fluid," and about its use—a work in which he has been engaged for more than twenty years—and he was encouraged to hope that it might be useful in the class of cases under discussion. He would be glad to hear the opinion of the essayists on the subject.

Dr. Robert Levy, Denver, said the sign of which Dr. Jackson had spoken—the accumulation of secretion in the pyriform sinus—had been observed by him in cases of tuberculosis with painful deglutition. He had seen cases in which these sinuses were completely filled.

Dr. R. H. Craig, Montreal, suggested the use of the high frequency fulguration spark in the treatment of inoperable cases of this nature. He cited a case in which the pain absolutely disappeared and the growth was greatly reduced. The patient, however, died six months later. In another case of malignant disease involving the sphenoid and the nasopharynx, after a month's treatment the pain disappeared and the growth was much reduced in size. He believed the high-frequency fulguration spark is of great value in alleviating pain and diminishing the growth in these desperate cases. Where the growth was accessible, carbon dioxid snow might be useful.

Dr. Joseph C. Beck, Chicago, asked Dr. Jackson if he had employed the Abderhalden test for carcinoma. He also asked Dr. Jackson to specify, in closing the discussion, what he meant by "small quantities" of radium. He had employed nineteen milligrams of the salt or ten milligrams of the pure radium element.

Dr. Mosher, in closing the discussion, said Dr. Skillern's remarks interested him. He had tried the procedure of suspension esophagoscopy, and had found it satisfactory in the examination of the upper part of the esophagus. He had not had the trouble with the breathing which Dr. Skillern mentioned; in fact, he had been astonished to see how little trouble he had had in this regard. Referring to Dr. Iglauer's case, he said he had reported a case three or four years ago where the same procedure was used. It was a case of absolute stenosis of the esophagus, and he attacked it from above and below. The procedure which helped was that of picking the stricture apart, ballooning, and picking it apart again. In his experience, perforating the esophagus led to fatal mediastinitis.

Dr. Jackson, in closing the discussion, said Dr. Mosher was the highest authority on the anatomy of the esophagus. Dr. Jackson believed that all the early esophagoscopists and many of today mistook the hiatal constriction for the cardia. The question of anesthesia was a matter of the personal equation. Every man should select the instruments which suit his needs best, and so it is with anesthesia. The method should be selected which suits the operator's needs in the particular case. Personally the speaker had been very much interested in the case reported by Dr. Yankauer. He thought the work of Dr. Yankauer and Dr. Meyer would open a new field.

The procedure mentioned by Dr. Iglauer was exceedingly interesting, and while it was a failure in the case cited, it was justifiable in absolutely impervious strictures, and offered hope of success. In cooperating with Dr. Brenneman he had passed a tube to serve as a staff upon which Dr. Brenneman cut the occluding cicatrix from below through the externally opened stomach. Such procedures were, of course, indicated only in impermeable occlusion. If any lumen existed, however small, it could be cured by the safer endoscopic methods. Dr. Cott's point was well taken. Answering Dr. Goldstein's question concerning recurrence of spasmodic stenosis, the speaker cited a case of spasmodic stenosis, in which he absolutely failed. He stretched the abdominal esophagus so completely that he could see into the stomach, and yet recurrence took place. This was, however, his only failure so far. The patient became discouraged and finally gave up treatment. Referring to Dr. Makuen's remarks concerning Coley's fluid, he said the method was applicable to sarcoma, and that it was in this disease that radium also gave best results, carcinoma being less amenable. Both methods could be used in the same patient. He suggested that in the cases of filling of the pyriform sinuses by secretions, mentioned by Dr. Levy, there might possibly be spasm in the cricopharyngeal muscle, causing temporary stenosis with resultant filling of the pyriform sinuses, or, in other instances, a disinclination to swallow because of the odynophagia which might exist. Or in still other instances, an actual organic esophageal stenosis due to tuberculous infiltration of the "party wall" might be present. Nevertheless, Dr. Levy's point was well taken. Dr. Jackson hoped that fulguration and carbon dioxid snow would be thoroughly tried out, but he had had no experience with either. He had not employed the Abderhalden test, as suggested by Dr. Beck, but all diagnostic methods should be used. With reference to the dosage of radium, he said a small dose, such as ten milligrams, acted as an irritant, because it cannot be left long enough in the esophagus. A hundred milligrams left in for an hour or more was usually required. He did not speak as an authority; he depended upon Dr. W. H. Cameron and Dr. William Proescher for dosage and duration of the radium application in each particular case.

Suspension Laryngoscopy in Children.

Dr. Robert Levy, Denver: Since the discovery of the laryngoscope by Garcia no more interesting chapter in the history of laryngology has been written than the most recent one by Killian, in which he describes the discovery of suspension laryngoscopy. Since Killian's original communication, suspension laryngoscopy has been elaborated, its limitations and advantages have been carefully proved and commented upon. It has been generally conceded that in adults its limitations are greater than in children. All observers early recognized its value in children, even before it had been tried out in many cases.

The suspension method possesses many advantages over the ordinary direct endoscopy. These are: The entire field and surrounding parts are clearly before one; both hands are free; the dangers from asphyxia are practically nil; and a remarkably clear view may be obtained of the anterior commissure of the larynx and trachea. The after-effects of the suspension method are of no more serious moment than are those of the most simple laryngeal manipulation.

The technic of the procedure in children differs but slightly from that in adults. It may be said to be somewhat easier, although in no event can this procedure be considered a difficult one. The tongue need not be drawn forward; in fact, little attention need be paid to it except to keep it in the median line. The head need not hang far over the table; in fact, if a pillow be placed under the shoulders, the head may even rest upon the table. In many instances, especially when examining or operating in the esophagus, the spatula need not be brought over the epiglottis, but, resting well at the base of the tongue, it will bring the parts into perfect view.

The question of anesthesia is an important one in children. As a rule, local anesthesia is not entirely satisfactory. On the whole, general anesthesia, preferably with chloroform, has given the author the best results.

The specific uses to which suspension laryngoscopy has been applied are: for examination, for diagnosis, for operation through the nasal passages, for the removal of foreign bodies.

A brief summary of the uses to which suspension laryngoscopy has been put and which have been reported is given, together with histories of six cases in which the method was employed by the author.

DISCUSSION.

Dr. Sidney Yankauer, New York City, agreed with all Dr. Levy said concerning suspension laryngoscopy. He had performed a number of operations with this apparatus, one of which he had reported before the western section of this society. After several operations by the general surgeon, the patient's neck was so scarred and the lumen of the larynx was so small that he could hardly get a probe through. The arytenoids were so adherent to the epiglottis that by the ordinary direct methods the lumen could not be seen, but with suspension laryngoscopy this could be accomplished. The passage of the first probe was followed by a larger, and finally he could pass a uterine dilator. By means of uterine dilator he could stretch the larynx sufficiently to get a rubber tube in, which was left in for two weeks, when a larger one was used. It was thus possible, finally, to introduce the intubation tube. The boy is now going about, and has been wearing the intubation tube for nearly four months. The suspension laryngoscope had been modified by Killian himself as well as by others. The new model which Killian had brought out does not appear as useful as the original model. He had not been able to bring the anterior commissure into view with the new device.

Dr. Samuel Iglauer, Cincinnati, was interested in Dr. Levy's remarks, and agreed with practically every point. While it was true that the procedure was less difficult in children, it could be carried out satisfactorily in adults. In bringing the anterior commissure into view one should use counter pressure with Albrecht's instrument or the finger. Killian recommended a dose of codein preliminary to the anesthetic in children. He had frequently followed this suggestion. Atropin should be used with ether in order to dry up the secretions. He had tried tonsil removal under suspension, but thought the Beck method far superior and much simpler than that of Killian. Referring to the removal of a broken safety pin from the larynx of a child five years of age, he really did not completely suspend the patient. He introduced the spatula and while supporting the spatula (and thus the patient's head) with his left hand, he could see the foreign body and removed it immediately with the forceps in his right hand. He had recently introduced radium into the larynx in the treatment of a papilloma in a young child. In another infant radium was applied to the outside of the larynx. He did not know the dosage because he did not own the radium.

Dr. Thomas J. Harris, New York City, confirmed what Dr. Levy had said with reference to the simplicity of the method in children and the wonderful view of the larynx obtained in the average case. He referred briefly to a case in which he applied radium in a child six years of age, using the suspension apparatus, with rectal anesthesia, one hundred milligrams of radium, of one million activity, being applied for twenty minutes. The first time he attempted to apply the radium, without the suspension apparatus, he thought it went into the esophagus instead of the larynx. When the apparatus was employed it was very much easier to see the papilloma and to make the application of radium. He recommended the use of rectal anesthesia in these cases.

Dr. Levy, in closing the discussion, had not found the report of Dr. Yankauer's case in his search for all cases to date in which suspension laryngoscopy had been employed in children. He thought the old Killian model of suspension apparatus better in children, but in adults he liked the Albrecht or Howorth modification. He had used cocain in adults, but in children he used general anesthesia. Morphin and hyoscin in cases in which a large percentage of cocain did not seem to abolish the laryngeal reflex were useful in adults. He had never been able to see why adrenalin was added to the cocain, inasmuch as it is not an anesthetic and as there is very little loss of blood in these cases. In some cases of children with chloroform anesthesia, the adductors contracted, the vocal bands came together, and the spasm of the larynx continued for some time. In such cases a dilute solution of cocain was of advantage.

The Clinical Significance of Bacteremia.*

Dr. John E. Sheppard, Brooklyn: Four cases are reported, which seemed to the author to be fairly illustrative of a considerable series of cases encountered at the Jewish Hospital in Brooklyn. The four cases, and others of the group from which these were selected, would appear to demonstrate that not all cases of otitic bacteremia need operation. To distinguish between cases which do and those which do not require operation calls for one's closest observation and best judgment. As aids, all too meager at times, it is true, in coming to a conclusion as to whether or not to operate, the author suggests the following points: (1) The general condition and appearance of the patient: Is there a markedly septic condition Is it increasing or decreasing? As of the greatest aid in determining this: (2) The temperature curve. (3) Whether the process is localizing or tending to become general. (4) Blood counts, frequent enough to keep a careful line on the patient's resisting power. (5) Blood cultures, sufficiently often to have a definite knowledge of the persistence of the organism in the blood, and whether the number of colonies per cubic centimeter is increasing or diminishing, thus showing whether or not the patient is in need of assistance in taking care of the bacteremia.

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*See page 864.

DISCUSSION.

Dr. Arthur B. Duel, New York City, thought the interesting reports by Dr. Sheppard served to emphasize certain principles in infectious processes which were of great clinical importance. It must be evident that in all infections the general clinical symptoms usually noted are the result of the action of bacteria or their products which have been poured into the circulation. When the general clinical manifestations are slight, the infecting focus is confined to an unfavorable locality for getting into the circulation, or the invading organism is slightly virulent. Thus, a follicular tonsillitis of streptococcic origin, will produce much more violent manifestations than a streptococcic otitis or mastoiditis. Similarly, a staphylococcic follicular tonsillitis, being in a favorable field for pouring its products into the circulation, may cause considerable general upset (though comparatively less than its more virulent cousins), while, confined to a bony cavity, it may cause hardly enough disturbance to be recognized. Whatever manifestation there may be, however, is undoubtedly caused by the bacterial invasion of the circulation. It may be asked, then, why bacteremia is not always demonstrable in suppurative conditions. The answer is twofold. In the first place, the methods of examination are not sufficiently delicate; in the second place, most of the organisms are destroyed almost immediately by the blood cells. Only a few of the most virulent type are able to live and multiply in the circulation. Is a demonstrated bacteremia, then, of no value as an operative indication? Of course it may be of the greatest value. In a case, for example, in which bacteremia is demonstrated, where the blood count shows a low resistance, and where the patient is doing badly, the obvious thing to do is to localize the process—to cut off the blood stream at that point—without regard to whether or not there is a demonstrable disintegrating clot. In fact, in his opinion, to look upon bacteremia alone in suppurative otitis or mastoiditis, as indicative of septic sinus thrombosis, is unwarranted. The bacteremia always precedes the clot formation—indeed, the alteration of the vessel wall by bacterial invasion is essential to the formation of the clot. At this stage it may not be always demonstrable by present methods, but theoretically it is present, and if methods of investigation were nice enough it might possibly be demonstrated a day before, or perhaps a week before, a recognizable clot has formed. Of course, after the clot has formed and has begun to disintegrate, the chance of demonstrating a bacteremia is much greater, because the infecting focus is in the most favorable situation for the constant discharge of large numbers of organisms into the circulation. Yet, with a patient doing badly, one might feel quite justified in isolating the infecting area, whether bacteremia could or could not be shown. On the other hand, with the patient doing very well, the demonstration of a bacteremia might not necessarily demand an operation. Hundreds, of course, recover every year without its having been thought necessary to demonstrate the bacteremia, which is undoubtedly present, and will doubtless continue to do so. One should carefully avoid taking too narrow a view of the clinical significance of bacteremia.

Dr. Charles W. Richardson, Washington, considered the demonstration of bacteremia an important point in the history of all cases of probable sinus infection. Whether a positive bacteremia is always indicative of sinus thrombosis was a question still subject to considerable dispute. In cases on the borderline, as it were, the condition of the blood was of much value to the clinician, and should be of great assistance in deciding whether operative intervention was demanded. Without clear and definite indications from a clinical point of view, there was no doubt that many would be loath to go into the sinus, although the experience of Gruening and others would seem to demonstrate that in cases of simple bacteremia, without very pronounced clinical symptoms, there might be sinus thrombosis. How far one would be warranted, with the evidence of bacteremia and without clinical evidences of sinus thrombosis, in delaying operative intervention was a question. With bacteremia, even without clinical evidence, he would be loath to delay. Dr. Sheppard's cases were almost negative, in a certain sense, especially his nonoperative cases, in which he was fortunate in that they recovered without operative intervention.

Dr. Seymour Oppenheimer, New York City, was under the impression that Dr. Duel and his confreres at the Manhattan Eye and Ear Hospital were no longer at variance with Dr. Libman and Dr. Ceiler and others at the Mount Sinai Hospital with reference to this question of bacteremia. At Mount Sinai it was held that acute otitis per se never caused bacteremia, and these views had been corroborated by the clinical findings. This difference of opinion was thought to be largely a matter of variance in laboratory technic, the fact that the Manhattan Eye and Ear Hospital reached different conclusions being considered at Mount Sinai to be due to some error in laboratory technic. He and his associates at the latter institution had not changed their viewpoint at all, being still of the opinion that suppurative otitis per se does not cause bacteremia. They were also of the opinion that demonstrable bacteremia is a clinical expression of sinus thrombosis. Up to the present time they had had from ninety to ninety-five cases of sinus thrombosis in which bacteremia had been demonstrated in advance of operation, and in not one case had the operation failed to demonstrate sinus thrombosis. It was a curious fact that if they were wrong in their deductions, they were able to demonstrate conclusively, a few hours after opration, that the blood culture became sterile, showing that the operative procedure must have attacked some local focus which was responsible for the infection. In two hours, in some instances, the blood had become sterile. In some cases the blood culture still remained positive, but there were other explanations, such as vegetations on the heart valves secondary to the initial infection.

Dr. S. MacCuen Smith, Philadelphia, asked Dr. Oppenheimer whether he depended upon the blood cultures for indications for operation, or whether he was guided by other symptoms of the disease.

Dr. William B. Chamberlin, Cleveland, said if he understood Dr. Sheppard correctly, he opened the lateral sinus but made no mention of ligating the jugular. He could see no reason, under the circumstances, for not immediately ligating the jugular.

Dr. Ewing W. Day, Pittsburg, called attention to one point that seemed to have been overlooked. There was a tendency to take for granted that every lateral sinus patient, unless operated upon, dies. If a patient with a thrombosis got well, it was no indication that the sinus was not blocked. He had had cases in which the sinus was completely obliterated by clot, and he could not say that if the patient got well there was no clot.

Dr. Oppenheimer, continuing the discussion, said, in answer to Dr. Smith's question, he had been particularly cautious, by reason of these controversies, in not being too enthusiastic. Many cases had been admitted to the hospital with but the fewest of otitic symptoms, with suggestions of typhoid fever, possibly, with no symptoms of mastoiditis, but with a positive blood culture. He had been extremely cautious in saying he was dealing with infectious phlebitis, and had deferred operating until all other possible causes had been ruled out. Invariably they had found a thrombotic condition in the sinus.

Answering a question by Dr. George L. Richards as to whether all his ninety or ninety-five cases were operated upon, he said they were.

Dr. Wendell C. Phillips, New York City, verified Dr. Day's statements. He had been struck, years ago, in operative surgery on the ear, to find occasionally an obliterated sinus from an old sinus thrombosis.

Dr. John A. Thompson, Cincinnati, recalled having treated a brother laryngologist for suppurative ethmoiditis. He developed an abscess in the big toe, which was opened under antiseptic precautions, and examination of the pus revealed the presence of streptococci. The nasal accessory sinuses were sometimes at fault in bacteremia.

Dr. Sheppard, in closing the discussion, said he simply reported four cases as a part of a group of cases of bacteremia, many of the group being cases which had been operated upon. Regarding the tying of the jugular, he had rather settled down to the rule of not tying it if there is a reasonably good return flow from the bulb. Should there be no return flow, he waited a day or two and then tied off the jugular. It was probably true, as Dr. Richardson suggested, that he was fortunate in not having bad results. Possibly more than simple good fortune is indicated by the fact that the cases referred to were selected from perhaps fifty or more cases of bacteremia, of which he had kept careful records, and of which twenty-five at least had not been operated upon. Dr. Thompson referred to other sources of bacteremia. This fact needs always to be kept in mind. He very decidedly does not advocate operating upon all cases of bacteremia. Dr. Oppenheimer spoke of his cases as being cases of suppurative otitis. Three of the cases reported in the paper were nonsuppurative otitis. He questioned the necessity of operating upon all these cases if they are properly watched, especially if in conjunction with a practical bacteriologist. He thought more extensive observations would ultimately teach in which cases to operate and in which surgical intervention was not necessary.

Treatment of Purulent Cerebrospinal Meningitis.

Dr. William Sohier Bryant, New York: The object of this communication was to apply the experience of an unusually successful case to the management of this infection.

The treatment of purulent septic meningitis consists of (1) treatment for relief of the intracranial pressure; (2) treatment of the toxemia; (3) treatment of the focal infection. The goal of the treatment is the control of intracranial pressure and toxemia, and the treatment should, therefore, be symptomatically directed against these two means of fatal terminations of the disease.

The following case, showing recovery from purulent streptococcic cerebrospinal meningitis, was offered: The patient, male, twenty-two years of age, with symptoms of rapidly increasing coma, neuromuscular signs of meningitis, rigidity of neck, choked discs, and purulent otitis media and mastoiditis. Temperature, 102.5°: pulse, 40. Spinal fluid contained cocci in pairs and short chains, and pus. Decompression at once removed the mental symptoms. Mastoid operation, hypodermoclysis, enemata, saline solution by mouth, and solution of magnesium sulphate by mouth. On the seventh day following decompression, all signs of meningitis had disappeared. Patient died one hundred and eighty-eight days after the decompression operation, from toxemia caused by the repeated secondary infection of the decompression wound.

From this case the following conclusions are reached: "The combination of our experience as otologists with the experience of the obstetrician, makes the outlook for successful treatment of streptococcic meningitis appear much brighter than it has previously appeared. Otolaryngologists should get as good results in cerebrospinal meningitis as the obstetrician obtains with puerperal sepsis cases. Although the surgeon can readily protect the patient from death by intracranial pressure, the management of the sepsis is quite another problem. This problem of sepsis has received more attention from the obstetrician than from any other medical group or specialty. The treatment should be focused on decompression, local and systemic drainage, administration of magnesium sulphate, and stimulating general hygiene."

The Operative Treatment of Meningitis—Supplementary Report and Analysis of Cases.

Dr. Samuel J. Kopetzky, New York: The author reiterates the statement with which Dr. Irving S. Haynes prefaced his argument presented before this society in 1912, advocating the trial of "drainage of the cisterna magna" to cure certain types of purulent meningitis: "Septic conditions are usually surgical opportunities and demand surgical treatment."

The operative treatment of purulent meninigitis had undergone scientific inquiry ever since the above statement was made, and the author presented the position now held by both Dr. Haynes and himself, after two years of further study and experience with meningitic infection.

The object of the Haynes operation—the successful evacuation of pus accumulations and the eventual restoration of an unhindered blood supply to the vital medullary centers—and the author's work of disentangling the complex picture of meningitis so as to give data upon which an early diagnosis might be based, thus leading to a very early institution of this surgical relief before the disease had exhausted the patient and general sepsis had supervened, were fulfilled, and yet the establishment of drainage and its accompanying phenomena failed to secure the desired ends.

Critical study of the cases operated on presents the basis for the opinion that meningitis is not simply a surgical problem, to be solved by finding a safe method by which to eliminate the pus accumulation in the cerebrospinal fluid and to establish intracranial decompression; the analogy between the situation presented in purulent involvement of the meninges and infections of the peritoneum. or the pleura, does not hold. The change in the brain tissue is a factor of great moment in the aspect of the situation as at present considered.

In the author's opinion, a larger number of intrameningeal invasions are brought about by the hematogenous route, and in otogenic meningitis the mechanics of infection are analogous to those which are found in the tuberculous and meningococcus types of meningitis.

If this hypothesis be accepted, improvement is not dependent, as has been maintained by some observers, on the lack of toxins generated and washed away from the blood stream, but is due to the remission of symptoms wholly due to decompression effects on the vital centers, and the unembarrassed blood supply to the brain as a whole. The period of improvement really marks no advance toward the cure of the meningitis, but is only an evidence of the control of the pressure factors in the case. The study of the cases leads to the belief that the final stage is not one of sepsis, as has been held by some. These patients, even when they ran high temperature curves, did not present themselves as individuals suffering from sepsis. The blood examinations which were conducted in this stage were uniformly found negative for cultures on various media. The manner of death differs from that of death by sepsis. The patients all die suddenly, without paralytic phenomena, as if some unknown element suddenly overwhelmed them. The manner of death is significant of the inflammation of the brain tissue, which is progressively advancing in nature, and when the cells composing the brain itself are affected to a given degree, unknown in its definitiveness by means at hand at present, then life ceases because its governing, controlling centers are inherently prevented from continuing their functional activity.

These conceptions concerning meningitis have been won because of the operation of cisternal drainage, and the careful study of the conditions which resulted from the operation. Inasmuch as this newly acquired knowledge may serve as a stepping stone toward the eventual solution of these additional problems, the operation of cisternal drainage may yet mark an epoch in the effort to combat the ravages of the disease.

The operation should not be discarded entirely. It may prove a useful measure in selected cases, and if the other factors entering into the problems presented in meningitides come to solution, this means of operating will probably find renewed use because of the easy access it permits to the parts affected.

The author concluded by expressing the optimistic belief that the right road is being followed, that the surgical treatment of meningitis has advanced the comprehension of the disease, and that eventually means will be found to lessen the mortality percentage in this grave condition.

Dr. Ewing W. Day, Pittsburg, thought the only thing that had been accomplished so far by the work under discussion was to overthrow some of the existing theories. Cushing's theory, to the effect that death is caused by pressure and that if the pressure is eliminated the disease can be overcome, had been entirely overthrown. The cerebral circulation was not sufficiently well known for one to understand the matter. The work of Leonard Hill, of London, on the circulation was important in this connection. The easiest and most direct tract was through and down the posterior part of the brain. The place where the maximum amount of pus was found in all his postmortems was back of the optic chiasm in the region of the cistern of the chiasm. He had thought there were probably some places where the circulation is very sluggish, and that around the cisterna, back of the chiasm, where it supports the medulla, the circulation probably moves considerably more slowly than it does in other portions of the brain. It was in such places that pus was found in quantities sufficient to amount to an abscess. It seemed to be demonstrated that the space in front of the medulla could not be drained. That seemed not to be affected by drainage. He believed Dr. Kopetzky right when he said there is sepsis going on in all cases of meningitis. Almost all the cases, following drainage, ran a markedly septic course, with daily variations in the temperature, ranging from normal to 104°. In one case sinus thrombosis was suspected and the sinus was opened, with negative results. In some cases the disease ran a typical septic course, the patient going off into coma, as in advanced typhoid, with muscular relaxation, loss of control of sphincters, dilatation of the pupils, and gradually going off into death. This was not the course in all instances, but in the majority.

Referring to the case cited in Dr. Bryant's paper, in which streptococcus serum was used, the speaker said all the symptoms of meningitis were present, yet the patient recovered. He did not believe the treatment had any effect in producing a cure—he thought nature did it. He did not believe there is any known agent or method which will cure an active meningitis.

Dr. Francis P. Emerson, Boston, emphasized the fact that two principles are to be observed in the surgical relief of any septic affection: First, the establishment of adequate drainage; second, the removal, as far as possible, of the diseased focal areas. The second problem in the surgical treatment of meningitis was impossible. With regard to the first, it was important to establish drainage early in the course of the disease, before the toxemia and sepsis have lowered the vitality of the patient. Theoretically it might be better to relieve the pressure by reversing the lymph current. He thought a study of the autopsy findings would cause one to hesitate about operating upon any case, especially those similar to the admirable group which Dr. Day presented last year before this society. Some cases have recovered without surgical intervention and others have been cured by operative treatment. In the former class of cases the cerebrospinal fluid was sterile. The question of diagnosis with reference to deciding whether or not to operate was important. The symptoms which led to the clinical diagnosis of meningitis did not tell whether one has to deal with a circumscribed or a diffuse meningitis. Even should an active organism be found in the cerebrospinal fluid, it was necessary to cultivate it before a decision could be reached as to its virulency. Dr. Kopetzky's work, therefore, was important in stimulating renewed interest in the subject, that there may be more exact data for operative interference. His personal feeling, however, was that, so far as relief from surgery was concerned, sufficient advance had not been made in securing such data, and the results from surgery had not been sufficiently satisfactory to warrant the advocacy of any particular line of operative intervention.

Dr. J. S. Kirkendall, Ithaca, had been interested recently in the report of a case from a young physician in Ithaca who is well versed in pediatrics. Dr. W. L. Van Pelt told him that a young child had tuberculous meningitis soon after birth, its weight being only nine pounds. He gave this infant twenty-five grains of urotropin daily and the child recovered.

Dr. Wendell C. Phillips, New York City, was interested in the case mentioned by Dr. Kirkendall, and asked if the cerebrospinal fluid was examined.

In Dr. Bryant's paper, descriptive of a case of purulent meningitis, the essayist had mentioned that the patient had a pulse rate of forty. A pulse rate of forty had never been observed by Dr. Phillips in an uncomplicated case of purulent meningitis.

Dr. Joseph C. Beck, Chicago, had always understood that the pneumococcus was the least virulent of the organisms found in meningitis, and had thought his case of meningitis which recovered was that in which this organism was present. He had been working along this line for a number of years. He had had two cases within the last year in which he operated by the Haynes method. Both patients died, but he had learned a good deal from them. In one case of cerebrospinal meningitis he gave urotropin, in doses of one hundred and eighty grains a day, then withdrew ten cubic centimeters of blood and allowed it to settle to form a serum, which he drew off, centrifuged and injected four cubic centimeters intraspinally, as suggested by Swift and Ellis with salvarsan in syphilis. The result was that he had a very irritable patient, with a very clear mind, for three days, but the man went on to death just the same. In another case he used collargol intravenously. There was a distinct change in the fundus of the eye in the form of a pigmentation.

Dr. Day, continuing the discussion, said he was asked by one of the surgeons why he did not drain the space in front of the medulla. He did that in one case, placing the drain underneath the dura, passing it up to the cisterna, back of the chiasm, in front of the medulla. The patient went on to death just the same. He had to go inside the dura, and the cerebellum was crowded up, cutting off the drainage. The only other possibility was to put in a lead tube.

Dr. Thomas J. Harris, New York City, said Dr. Bryant had closed his paper by expressing hope for the class of cases under discussion, and yet had cited only one case in which there was recovery. From a careful study of the literature it was the speaker's opinion that many such cases have been reported. One should be encouraged by well authenticated cases which recover. One or two cases had been reported in New York which, he felt perfectly sure, were cured. The Germans made their diagnosis upon the findings in the cerebrospinal fluid, pronouncing the case one of meningitis when the meningococcus was found in the fluid. One German clinic had reported forty cases of cured recurrent meningitis. This should be encouraging to all who are working along these lines.

Dr. Samuel Iglauer, Cincinnati, called attention to the importance of some experimental work on the circulation of the cerebrospinal fluid which Dr. Kramer of Cincinnati had been doing. This might readily explain the failure of the Haynes operation to provide adequate drainage in otitic mengitis. According to Kramer, circulation of the cerebrospinal fluid below the tentorium is separate and distinct from that above the tentorium. If this be true, then drainage through the cisterna magna will fail to relieve the areas commonly involved in otitic meningitis. Kramer has also shown that methylene blue injected in the lumbar region of animals will enter a small pore in the lower portion of the spinal cord and ascend (ciliated epithelium) through the central canal to the fourth ventricle. Through a similar action he explained the fatal effects occasionally noted when serum (with toxic tricresol preservation) was injected in the lumbar region of children for the relief of epidemic meningitis.

Dr. Seymour Oppenheimer, New York City, spoke of a case which Dr. Haynes quoted in his original paper. All the evidences of acute meningitis were present, and there were signs of some intracranial involvement. The child was operated upon promptly, the findings being sinus thrombosis, mastoiditis, extradural abscess, and a large area of encephalitis. The patient recovered. Four weeks later meningitis developed. Lumbar puncture was made and streptococcus mucosus found. Six months later the child again went into coma, and again the streptococcus mucosus was found. It had had previously a very short and acute attack of nasal infection. The postnasal infection could easily go through the roof of the aural cavity, the bony wall having been removed at the original operation. Fortunately he obtained a postmortem. He found evidences of an acute meningitis over the region of the middle cranial fossa. This suggested the point that, in view of the fact of it being impossible to differentiate clinically between circumscribed and diffuse meningitis, it is probable many cases reported as cured are cases of very circumscribed suppurative meningitis.

The Observation of Nystagmus Through the Closed Eyelids.

Dr. Edmund Prince Fowler, New York: The anterior portion of the eyeball is the segment of a smaller sphere than the posterior portion, and consequently the cornea projects from the sclerotic somewhat in the same manner that a water glass does from its case. In different people and at different ages the degree of curvature varies, but at all times it is sufficient to enable one to follow movements of the eyeball in every direction, though the eyelids be closed. By observing nystagmus through the closed eyelids the following advantages are gained: (1) The eye muscles are at rest, and no accommodation or fixation occurs. Thus all patients may be tested under equal conditions in so far as these uncertain and disturbing elements are concerned. (2) There being no effort at fixation, after rotation, nystagmus endures from twice to three times as long as when the eyes are opened following rotation. Thus a longer, and hence a more accurate, guide is furnished for the rotation tests, and nystagmus may be aroused by weaker galvanic and caloric stimuli. (3) During vertigo there is an involuntary tendency to close the eyes and to keep them closed, as this lessens in some measure the dizziness. (4) By the use of suitable indicators, properly attached to the eyelids, the eye movements may be magnified a hundredfold, thus making for ease and accuracy of observation. (5) Upon properly placed revolving drums, or moving sheets, such indicators may be made to graphically record nystagmic movements of both eyes, during and after rotation of the body.

A means is thus provided wherewith to estimate not only the duration of nystagmus during and after rotation, and the caloric and galvanic tests, but to study the magnitude and frequency, gradations and variations of nystagmus in both eyes under different conditions. Such a study cannot fail to contribute something to the understanding of vertigo and allied phenomena.

A study of the modifications of nystagmus in disease is made possible by the means suggested, and a nystagmogram may be preserved for future reference.

In order that inertia and momentum may be practically nil, the author has used paper or straw indicators, one end stuck to each eyelid, usually to the nasal side over the junction of the cornea with the sclera. Zinc oxid plaster or auto tire cement are satisfactory adhesives.

One disturbing factor is the winking or twitching of the eyelids. This is clearly recorded upon the tracings. After a little practice these may be easily distinguished from the nystagmus oscillations.

For making the nystagmographic tracings a sphygmograph mounted upon a hocky puck is used, the latter being held between the teeth of the patient, and the blackened paper ribbon fed from the rear towards the front, away from the patient.

DISCUSSION.

Dr. Arthur B. Duel, New York City, thought Dr. Fowler had presented a very ingenious method of making permanent records of ocular phenomena in vestibular nystagmus. He did not think such observations necessary to diagnosis, but when the apparatus was perfected the records, for those who understood them, would be useful in reporting cases. The tracings of nystagmus would leave no doubt of its presence. When one must depend upon the house staff to report cases that arrived during one's absence, these tracings could be made and put into the records for subsequent study.

Dr. Fowler, in closing the discussion, said patients did not notice as much vertigo with rotation or following caloric reactions with the eyelids closed as they did with them open. For instance, one could produce nystagmic movements of the eyes with caloric stimulations and stop before the vertigo came on. Irrigation usually makes patients deathly ill, and it surely is a great advantage to be able to avoid this annoying feature of the labyrinth tests. In many neurasthenics the rotation tests show nothing on account of the incessant blinking and rolling of the eyes around and about. If the lids are closed some approximation to the duration of the nystagmus may be ascertained.

SYMPOSIUM: AURAL COMPLICATIONS OF THE EXANTHEMATA.

(a) Etiology, Diagnosis and Treatment.

Dr. Charles R. C. Borden, Boston: The present communication is practically a continuation of a paper presented at the Ninth International Otological Congress, in Boston, in 1912, based upon a study of the aural conditions found in four hundred and fifty-four autopsies after death from diphtheria, scarlet fever and measles. Only aural complications of exanthemata are considered, and not aural diseases in general, and only severe cases, such as are seen in hospital practice, not the mild variety usually encountered in private practice.

Aural complications in the exanthemata occur in from five to forty-four per cent of clinical cases, as stated by different writers. In fatal cases this percentage was found to be greatly increased. In the autopsy reports upon which the paper is based, the percentage in diphtheria was eighty-two, in scarlet fever ninety-four, and in measles one hundred per cent.

One would naturally expect unrecognized and untreated middle ear inflammation or mastoiditis to go on to meningitis, brain abscess, and jugular thrombosis, but the autopsy records showed only four cases of septic meningitis (not necessarily of middle ear origin), one case of infection of the jugular vein, and not a single case of brain abscess. Complications in the heart, pleura, joints, and kidneys, on the contrary, occurred with startling frequency. While it could not be held that all of these complications arise from middle ear disease, a certain number are. Age is usually an important factor. Generally speaking, the younger the patient the greater the susceptibility to aural complications.

The symptomatology of the aural complications in the different exanthematous diseases is given in brief detail. The most striking variation between the three diseases, diphtheria, scarlet fever and measles, is in the appearance and characteristics of the pus found in mastoiditis at autopsies in diphtheria. In scarlet fever and measles it is of the ordinary variety and is usually copious in amount. In diphtheria it is repeatedly described as green, yellowish green, brownish green, or other colors bordering upon a greenish hue, and as being thick, tenacious, gummy, gelatinous or semisolid, etc. The marked peculiarity of the discharge may largely account for the lack of active symptoms which seem to be peculiar to aural complications of diphtheria.

As the infection, in aural complications of contagious diseases, reaches the middle ear by way of the eustachian tube, and the nose and nasopharynx are the seat of active inflammations, these would seem to be the structures to which preventive measures would be aimed, but experience and practice have proved otherwise. Irrigation of the nose and nasopharynx, which was formerly so commonly practiced, is now considered, by the physicians and aurists at the Boston City Hospital, to be absolutely contraindicated, under any circumstances, and this includes all sprays and douches, as well as aural irrigations.

There is but one true method of preventing aural complications, viz., through the removal of adenoid tissue before the patient contracts a contagious disease.

Inasmuch as aural complications are usually well established before attention is called to them, the treatment is almost entirely surgical. In general it is the same as in ordinary aural practice, with one or two exceptions. The important difference is the low vitality of the patient and the increased virulence of the infection. Nature is to be relied upon less in such cases than at other times. Middle ear inflammation which might be aborted under other circumstances fails to respond to the usual mode of treatment in contagious diseases. The ordinary methods of treatment are not available. If the drum membrane is found to be red and inflamed, paracentesis is indicated. Hot irrigations seldom accomplish the desired results. Inflation of the middle ear, and postnasal applications, not only avail nothing, but decidedly increase the inflammatory process. The inhalation of hot steam is a safe procedure, but usually fails to give relief. Free paracentesis is the only accepted method of procedure, and should not be delayed. Hot irrigations are advantageous. As the discharge becomes less in amount it is often better to discontinue the irrigations and to substitute warm peroxid.

The sudden cessation of a discharge that has been profuse should at once direct attention to the mastoid. Whenever the middle ear is suspected of being the primary source of infection in complications of a serious nature and free paracentesis has failed to control the aural inflammation, the mastoid should be opened at once.

Summing up the treatment of aural complications in exanthemata, two methods are efficacious, viz., hot irrigations and paracentesis.

(b) The Etiology, Diagnosis and Treatment of the Aural Complications of the Exanthemata.

Dr. Stanton A. Friedberg, Chicago (by invitation): In considering the etiology of the aural complications arising during the course of the exanthemata, it may be broadly stated that their number and severity will depend upon the class of patients and the character of the epidemic. Other factors that must be taken in the light of predisposing and contributing causes are age, climate, season, physical condition of patient, condition of the upper respiratory tract, the specific infective disease, cross infections and systemic complications.

There can be no hard and fast rules established with reference to the diagnosis of the aural complications of exanthemata. In most cases conclusions in regard to the aural condition are reached in the same manner as in the ear infections from other causes.

The treatment of aural complications naturally divides itself into preventive and curative. The preventive treatment aims at the alleviation of the accompanying nasal and pharyngeal conditions. Early treatment depends upon the conditions present. Paracentesis and hot irrigations are advocated. The maintenance of drainage is important. In cases in which the aural discharge persists for several weeks, despite the most careful attention, consideration may be given (1) to the use of vaccines; (2) to the correction of conditions in the upper respiratory tract which contribute to a continuance of the infection; (3) to the mastoid operation to provide for better drainage from the antrum and middle ear cavity.

The treatment for the more serious complications does not differ from that pursued in cases arising independent of infectious diseases.

In concluding, the author emphasizes the following points: (1) The closer cooperation between the attending physician and the aurist in private practice. (2) The necessity of competent aural surgeons being in attendance in contagious disease hospitals. (3) The isolation of patients in these hospitals at least up to the period of convalescence, lessening the liability to cross infections. (4) The necessity of the closest attention to patients, which includes routine examination of the ears in at least the younger patients, and careful observation and treatment when symptoms of aural extension arise.

DISCUSSION.

DR. HENRY O. REIK, Baltimore, considered the papers of Dr. Borden and Dr. Friedberg as two of the most important presented before the society for some time. He congratulated the authors upon the very complete manner in which they covered the subject, the complete way in which they had digested the various facts, and the conclusions which they had brought out. He thought the matter might well be brought more closely to the attention of the general physician, and he hoped each author would take it upon himself to force it home to those who have charge of infectious disease hospitals. Dr. Friedberg had called attention to the importance of this in referring to the frequency with which aural infection takes place in infectious diseases. Dr. Reik had recently observed, in one large hospital in which four hundred beds were allotted to diphtheria and scarlet fever, that practically no attention was paid to the middle ear. Tympanotomy was rarely performed, and the ears rarely examined; the attendant waiting until the child complained of pain. Practically one-third of all the cases had spontaneous perforation and otorrhea, and a large percentage of these went out of the hospital with discharging ears. The number of complications which resulted could not be estimated in figures. In a similar hospital in Baltimore the same conditions pertained in 1912. With the advent of a new superintendent in 1913 the situation was changed. An otoscopic examination was made in every case admitted, and three examinations daily after admission, one in the morning, one at four o'clock, and one at night. Thirty-seven patients had developed some indication of otitis media. The examiner was very keen to observe this condition, and if there were any doubt as to the need of paracentesis he would operate. Each one of the thirty-seven had tympanotomy, and each child was dismissed with dry ears. In one hundred and ninety-one cases of scarlet fever every patient went out without otorrhea. That showed what could be done with careful observation and examination.

Dr. Borden referred to mastoiditis without tenderness. The speaker called attention, in this connection, to the fact that there is an instrument for measuring the presence and amount of tenderness, or rather the amount of pressure necessary to elicit tenderness, which is much more accurate than measuring it with the thumb and finger. This algesiometer was a very simple device, consisting of a rod working in a cylinder, with a spring arrangement for measuring grams of pressure. This apparatus could be placed directly over the antrum or over the tip cells. With this instrument it was often possible to elicit tenderness which the thumb and finger would not detect.

Dr. Joseph C. Beck, Chicago, said he staid away from these cases as much as possible. In Cook County Hospital, in Chicago, there was great neglect of patients of this class because men who were able to take proper care of them did not like to treat them. This was because of the danger of carrying the infection. He has had this experience in his own family, infecting his own child after treating a hospital patient. He could say definitely that there was no other exposure in this case. Every large hospital should have a contagious ward, in charge of physicians and nurses specifically trained for these diseases. Attending physicians should be called only when absolutely necessary. Another point to which he wished to refer was the matter of operating upon the nasopharynx and tonsils while the patient is still in the hospital. He had seen a large group of cases operated upon with excellent results, particularly with reference to recovery from the nephritis which is going on without typical findings in the urine or other manifestations elsewhere in the body. In a large hospital where operations could be performed under the most advantageous circumstances, especially with reference to the anesthetic, very satisfactory results could be obtained. He thought the open method of anesthesia a distinct advance. With reference to postmortem changes in the ear, Bezold's latest statistics showed that these changes are postmortem unless the autopsy is very promptly made.

Dr. J. S. Kirkendall, Ithaca, asked Dr. Borden how he dared to give one of these patients ether after kidney complications.

Dr. William B. Chamberlin, Cleveland, considered the papers presented by Dr. Borden and Dr. Friedberg very important. He mentioned a case of aural complications of scarlet fever which had come under his observation during the winter. The patient was a man, thirty-five years of age, whose drum membrane had ruptured spontaneously without premonitory symptoms. He was still in bed, the scarlet fever infection having almost spent itself. There was still a profuse discharge from the ear, but no signs of mastoiditis. One morning the nurse noticed a swelling behind the ear. He operated, finding the most extensive mastoid process he had ever seen and every cell filled with pus and granulation tissue. He called attention to the value of the X-ray in making a diagnosis in the class of cases under discussion. Dr. Ingersoll and he, at the Lakeside Hospital, had X-ray examinations made in all cases. In chronic cases he did not rely so much upon it, but in acute cases it was of the greatest value. In questionable cases he thought the simple mastoid operation would do no harm if there proved to be no mastoid involvement, and was attended with little danger. Should there be mastoid involvement, failure to operate would do great harm.

Dr. A. P. Voislawsky, New York City, asked if the essayists were able to stop the aural discharge. He had had a great deal of trouble in having to keep children week after week on account of his inability to check the otorrhea.

Dr. George M. Coates, Philadelphia, referred to the value of vaccine therapy in the management of the conditions under discussion. He called attention to a report of McKernon, made to the society in 1910, in which he stated that by the use of autogenous vaccines in cases of mastoiditis following measles and scarlet fever upon which he had operated, the time for wound healing, which is usually much prolonged in these cases, was reduced to the normal. A report of Weston and Kolmer, in 1911, shows the results of one hundred cases of suppurative otitis media (scarlatina) treated with autogenous vaccines. Their work was done in the Philadelphia Hospital for Contagious Diseases. Under old methods of treatment, according to the histories of many hundreds of cases, it was found that the percentage of dry ears obtained under thirty days was only 7.46. With the use of bacterins this was increased to 22.9, which is a considerable gain and a fair index of the value of bacterins in this class of cases. Undoubtedly more dependence will be placed on this method in the future.

Dr. Dunbar Roy, Atlanta, agreed with Dr. Borden with reference to the irrigation of the nasal chambers in exanthematous conditions, believing that it produced more irritation and gave rise to more possibility of infection of the middle ear than if left alone. In the later stages, when the discharge was very thick and mucopurulent secretion came from the lateral sinuses, it was sometimes pitiful to see young children trying to get air through the nasal passages. So long as the secretion existed it rendered them more liable to infection of the middle ear. In such cases he used a small rubber tube with a bulb at one end. By inserting the free end of the tube into the nasal passage of one side and blowing air through it he had found it possible to blow through the opposite side large quantities of secretion. The secretion was thus prevented from going up into the eustachian tube. The child was rendered much more comfortable by clearing out the nasal chambers in this way.

Dr. H. Holbrook Curtis, New York City, thought it would be better to suck the secretion out than to blow it up in the manner described by Dr. Roy.

Dr. Talbot R. Chambers, Jersey City, spoke favorably of the Yankauer nasal speculum, through which he had relieved the discharge in a number of cases of eustachian catarrh, by means of iodin applications.

Dr. Norval H. Pierce, Chicago, emphasized the importance of early paracentesis in these cases. It was absolutely necessary to resort to paracentesis early in order to prevent mastoid bone complications. If one remembered the anatomy of the regions involved—the aditus, the cavum, the pneumatic spaces, all communicating by minute tubes with the antrum—it would be easy to see that paracentesis can prevent involvement of the mastoid bone only when done early. At the very inception of otitis media the infection spreads immediately down these tubes, and unless the paracentesis be done at a point in the course of the disease before the mucosa of the tubes swells, one would be unable to draw off the infectious material by capillary drain or otherwise, and it would dam up in the pneumatic spaces. The mucoperiosteum, as was well known, has the power of swelling enormously, no other tissue in the body having this power to an equal extent, nor of exercising it so suddenly. In twenty-four hours it could swell sufficiently to fill a large pneumatic space. Paracentesis, therefore, did most good when performed early. It was the retention of discharge and the swelling of the mucoperiosteum that produced decalcification of the bone and consequent mastoid involvement.

Dr. Thomas J. Harris, New York City, thought this symposium one of the most important which had come before the society in many years. He regretted that the general practitioner could not have joined in the discussion. He asked the essayists, in closing the discussion, to speak particularly of the prevention of the complete destruction of hearing following the exanthemata. Milligan, of Manchester, had advocated the mastoid operation of postauricular drainage in these cases.

Dr. Francis P. Emerson, Boston, advocated frequent inspection and, if in doubt, incision of the drum. He cited a case in which the patient, when first seen, had no other symptom than fever. He decided to wait, and four hours later the drum ruptured spontaneously.

Dr. Friedberg, in closing the discussion, maintained that the majority of acute otitis cases would recover if properly handled. The result depended largely, as Dr. Borden had said, upon the virulence of the infection and the vitality of the patient, but ordinarily the percentage of recoveries was large. In the series reported there were two cases out of thirty-five dismissed from the hospital with discharging ears. This showed what could be done by proper attention.

The Exploratory Opening of the Sphenoid Sinus.

Dr. Charles Prevost Grayson, Philadelphia: By this exploratory opening is meant one that can be made so extemporaneously, with so little discomfort to the patient, so little derangement of his ordinary pursuits, that it may be employed for merely exploratory or diagnostic purposes. The artificial opening advocated is made on the anterior wall of the sphenoid sinus, at a point as close as possible to the angle of junction of its floor with its internal wall. As regards the safety and facility with which it is made, this opening is on a par with the puncture of the nasal wall of the antrum beneath the inferior turbinate, or with the simple enlargement of the ostium frontale by means of the rasp or other instrument. This opening can be utilized for both exploratory and therapeutic purposes, and it has the advantage of not involving either the destruction or the crippling of any of the functionally valuable intranasal structures.

The technic of the operation is as follows: The inner or nasal portion of the anterior surface of the sphenoid body is exposed as widely as possible by shrinking the turbinates with one of the adrenal preparations. The field of operation is anesthetized with cocain and then rendered ischemic by the adrenal solution. When this has been done the course of the sphenopalatine artery is usually so distinctly visible that it can be readily avoided. The application of a dilute tincture of iodin will be sufficient for purposes of sterilization. The instrument with which the sinus wall is perforated is a straight drill, tipped with a conical bur six millimeters in length and measuring two and one-half millimeters from its point to its greatest diameter. The drill is applied two or three millimeters above the line which divides the anterior from the inferior surface of the sphenoid body and close to the attachment of the ethmoid plate in the middle line. The opening it makes is two millimeters in diameter, which is quite sufficient to permit the escape of any fluid within the sinus, the introduction of an appropriate irrigation cannula, or, should it seem advisable, the distal jaw of a biting forceps with which the opening may be enlarged. If the exploration of the sinus proves to be pathologically negative, the breach will close within twenty-four hours.

In closing, the author reiterated that his object in exploiting this method of investigating the sphenoid sinus is, in the first place, to dislodge the idea that the ostium sphenoidale should always be the starting point for any operation upon the sinus; to lessen, if successful in this, the frequency with which the middle turbinate is unnecessarily removed, or, in other words, to substitute for a somewhat formidable and tissue destroying operation one that is technically simple and unattended by any loss of functionally useful tissue; to lessen, also, the hesitation with which some thoroughly qualified men contemplate the surgical invasion of this sinus.

DISCUSSION.

Dr. H. Holbrook Curtis, New York City, defended the usual operation of opening the sinus through the natural orifice, for the reason that the frequent excursions of the cell described by Sieur and Jacob, impinging on both the sphenoid and antral walls, might, by injury, lead to an infection, and because the cell overhung the sphenopalatine fissure and ganglion, these structures, as well as the optic and superior maxillary nerves, might be injured in case Sieur's cell was entered by accident and infected. Dr. Curtis then went into the question of opening the inferior face of the sinus, which Dr. Grayson explained he had not advocated, and the remarks were withdrawn.

Dr. Ross Hall Skillern, Philadelphia, fancied, he could hear Dr. Grayson saying to himself, "How long, O Cataline, wilt thou abuse our patience?" He was not in accord with the essayist as to the indications for, or the method of opening the sphenoid. Unless purulent secretion were present in the sphenoethmoidal fissure in frank cases, or the typical pressure symptoms were present in the closed and latent type, he did not perceive the indication for exploratory opening. As to the method, he preferred the one which is constantly under control of the eye. This was nearly always possible in the presence of disease, for it was a well known fact that a diseased sinus is always easier to sound than a healthy one, this being due to the enlargement of the drainage passages by the constantly outflowing secretion. In his experience this was peculiarly adaptable to the sphenoid. Under these circumstances, after the sound had found the ostium and has penetrated into the sinus, it was a simple matter to introduce a small Hajek curette or an evulsor and to make a comparatively large opening in the anterior wall and at its thinnest part. All danger of penetrating the cribriform plate or completely missing the sinus was obviated. It would seem that this is really the safest and sanest method of approaching this cavity for diagnostic and therapeutic purposes.

Dr. Frank R. Spencer, Boulder, said one could easily use the Andrews probe to find the opening. It was perfectly justifiable to remove the posterior half or one-third of the middle turbinate in order to expose the sphenoid cavity. The thin anterior wall could be broken down and an opening gained which would be large enough for therapeutic purposes. That could be done without cocain anesthesia in simple cases.

Dr. John O. Roe, Rochester, said: "It is not difficult to find the natural opening of the sphenoidal sinus, although I think Dr. Skillern had located it somewhat lower than I have generally found it. My own method of locating the opening is to pass the probe along the lower border of the middle turbinate, using it as a guide, then by turning the end of the probe slightly upward, the sphenoidal opening is readily entered. In some cases the opening can be seen by anterior rhinoscopy when the middle turbinate is small. When the opening has been found, the cavity can be explored in every direction and any abnormalities dealt with as conditions indicate. Since suppurative conditions are those most commonly found in these cases, free drainage of the cavity, as pointed out by Dr. Grayson in his excellent paper, is of the utmost importance. This I have established most easily by taking away the lower wall with forceps, cutting downward in an anteroposterior direction. In the removal of this bone, however, I have not often found it so slender and fragile as Dr. Grayson has indicated, but, on the contrary, usually quite hard and dense, sometimes requiring the use of the chisel.

"I might relate, in this connection, that a few years ago there came under my observation an exceedingly interesting case of tic douloureaux, due to a myxomatous growth, occupying the entire cavity of the sinus, and on the removal of this growth the tic douloureaux subsided.

"When we consider the great anatomic variations in different skulls, in no case would I attempt to drill or chisel an opening into the sphenoid sinus without first having found the natural opening to serve as a guide for the operation."

Dr. Talbot R. Chambers, Jersey City, thought it better to start with the natural opening, enlarging it as much as necessary, rather than to make a second opening.

Dr. Grayson, in closing the discussion, could only repeat that in his opinion the chief objection to the usual method of opening the sphenoid sinus was that it was begun in what was concededly a region of risk instead of being cautiously ended there. He thought it better from every possible point of view to begin the operation at the point he had designated. Anyone familiar with the normal anatomy of the sinus, as well as with its occasional abnormalities, must admit that this is the safest locality not only at which to enter it but from which to begin the removal of its anterior wall. The terms thin and thick which had been applied to this wall were purely relative, and when one spoke of its lower being thicker than its upper portion it meant no more than a difference of one or two millimeters, which was certainly of no surgical consequence whatever. It was scarcely conceivable that anyone with the delicacy of touch that the rhinologist should possess could inflict any injury through this operation. Its greatest merit, in fact, lay in its freedom from any unnecessary or concomitant injury. The opening was made under the direct inspection of the eye, and there was no flow of blood to obscure the field of operation. In the large majority of cases it was necessary to remove no more than the inner portion of the anterior wall, and he had yet to hear a single good reason for continuing the ablation of the middle turbinate in order that we might begin our sphenoid operation at its awkwardly and, comparatively, dangerously placed ostium.

A New Technic for the Removal of Intrinsic Growths of the Larynx.

Dr. Robert Clyde Lynch, New Orleans: As perfect quiet is of the greatest necessity, the author insists on his patients being kept continuously in the surgical stage of anesthesia, securing perfect relaxation of the parts, conducing to the most accurate work. Having obtained a perfect view of the larynx (using his modification of the Killian and Albrecht suspension apparatus), with that organ and its owner quiet, he proceeds as follows: In vocal nodules the affected cord is picked up gently, turned to nearly an angle of forty-five degrees, in order that the under surface may be seen. The Killian baby forceps and Killian baby double cup forceps are used according to the size of the nodules. If the growth occupies the superior surface and is seen to involve mainly the subepithelial structures, the surface layer is split with the knife and the small tumor picked out with appropriate forceps. The surface membrane is reapplied and the wound dressed with tincture of benzoin compound and collodion. In single pedunculated tumors the tumor is picked up with the forceps, encircling the base with a wedge shaped incision, removing it by clear dissection with a knife. Single papillomata are grasped with forceps and shaved off below the level from which they spring. In the case of multiple papillomata the mass is grasped with Killian baby forceps and the entire area clearly dissected. Lest some small portion might be left behind, the whole surface is gently curetted, including the subglottic area.

Intrinsic epithelioma of the larynx is removed completely, by dissection, through the mouth, the tumor being delivered in one mass upon a cartilaginous plate. A case cited by the author was the first on record, so far as he knew. The diagnosis and the fact of complete removal were verified by the microscope. By this method the tumor is removed in one mass without itself being disturbed by instrumentation or manipulation, which is the accepted surgery of malignant growths, thus diminishing the danger of recurrence.

The Proper Fields of Medicine and Surgery in Diseases of the Upper Air Passages.

Dr. John A. Thompson, Cincinnati: One-half of all the diseases of the upper air passages are curable by medicinal means alone. An intelligent use of known methods in medicine will often prevent complications that make operation necessary. The common diseases of the nose and throat are easily separated for treatment into three classes: First, those the treatment of which is purely surgical, such as deformities, deflections of the septum nasi, chronic sinusitis, all tumors, benign or malignant, adenoids, hypertrophied tonsils, quinsy, retropharyngeal abscess, foreign bodies, hemorrhages, and stenosis of the larynx. In some of these, preliminary treatment makes the operation easier and the recovery surer.

The second class includes diseases where combined medical and surgical treatment is necessary. The most important, because the most frequent, disease of this class is hypertrophic rhinitis. After removal of the newly formed connective tissue in the turbinates, an analgesic germicide that will at the same time relieve congestion is indicated. Menthol meets these requirements. Camphor is similar to menthol in its local action, and can be advantageously combined with it.

Other conditions which require combined treatment are tertiary syphilitic ulcer, chronic granular pharyngitis, and edema of the glottis.

The third class is chiefly represented by acute rhinitis. Other conditions which may be treated by medicinal measures alone are acute catarrhal sinusitis that often accompanies acute rhinitis, acute laryngitis, simple chronic rhinitis, chronic purulent rhinitis, atrophic rhinitis, chronic laryngitis, chronic tracheitis, and chronic bronchitis.

The treatment ordered to abort an acute attack, with variations to suit the individual, is first a sweat, however procured. To open the nose blocked by the swelling, a solution of adrenalin may be used every three hours. A saturated solution of boric acid may be advantageously employed to dilute the adrenalin. Where the patient is seen in the second stage of the disease and the serous discharge from the nose is annoying, a spray containing one grain of atropin to two ounces of liquid petrolatum is very effective.

Two cases of Vincent's angina successfully treated with salvarsan in glycerin were cited.

Emphasis was laid upon the utilization of simple means, by which much can often be accomplished in various affections of the upper air passages.

DISCUSSION.

Dr. Joseph H. Abraham, New York City, regretted that he had come in too late to hear all of Dr. Thompson's paper, but he heard what was said with reference to Vincent's angina, in which connection he wished to present a remedy which he had used in four cases of verified Vincent's angina. It consisted of pure carbolic acid, fused, and applied, upon a cotton tipped applicator, to the ulcerating surfaces. Two applications were made a day, one when the patient came in in the morning and the other in the afternoon. The acid was allowed to remain in contact with the tissues from two to five minutes, and then neutralized with pure alcohol. The patient was given a simple cleansing mouth wash to use at home. In three cases, when the patient was sent to the pathologist the next morning, no bacilli and no ulceration could be found. In the fourth case a few scattered organisms could be found in the tonsils and quite a number in an ulcerated tooth socket. He removed the root of a tooth, curetted the cavity, and applied carbolic acid, and the next morning there was no culture. In each case the acid was used twice. Subsequent examination failed to reveal any bacteria, and the patient was dismissed with a cleansing wash.

Dr. Lee M. Hurd, New York City, considered intratracheal injections of various medications with oil one of the best methods of treating these inflammations. Intratracheal injections were not employed as much as they should be. In Vincent's angina any acid would do—trichloracetic, strong nitric, or any acid or strong caustic. The spirillum would not be found the next day. In very severe cases salvarsan, as suggested, was good. The oily injections would relieve the chronic laryngitis, and was useful in chronic and acute inflammation of the trachea. Sweet oil or petrolatum, about two drams, with some medication, injected into the trachea and bronchi had been found efficacious.

Dr. Talbot R. Chambers, Jersey City, referred to the theory of Sir W. Arbuthnot Lane, of London, concerning the use of petrolatum. According to this theory, petrolatum passes through the intestine and is not absorbed. Dr. Hurd advocates, in consonance with Dr. Thompson, the injection of two drams into the bronchi; Dr. Chambers would like to know what becomes of that oil. If not absorbed, it would become a foreign body.

Dr. Hurd, replying to Dr. Chambers, said the vaselin which he used was probably absorbed.

Dr. George L. Richards, Fall River, thought the demonstration of Dr. Beck of very much greater value to laryngologists than theorizing about the absorption of this or that oil. He had been especially impressed with the picture showing the blood vessels, which illustrated so clearly why hemorrhage takes place after these operations. The sections demonstrated also why there is infection and more or less mucopurulent periostitis after these operations. Work such as Dr. Beck had presented led to more exact knowledge. Therapeutics was largely a matter of theory, but this histopathologic work was certainly conducive to exact knowledge.

Dr. George F. Cott, Buffalo, recalled that in 1901 Dr. Thompson had read a paper on this subject. Since that time he had followed the suggestions then given, with very good results.

Dr. Theodore Corwin, Newark, thought the intratracheal injections most valuable. Patients could be taught to make the injections themselves, using a long dropper and injecting fifteen or twenty minims two or three times within ten minutes and repeating this every half hour or hour, so long as the cough was annoying. He used vaselin or other oil in combination with menthol, one or two per cent, camphor one per cent, or anything that might be desired. For office treatment the tracheal syringe was preferable, giving doses of one or two drams. It should be preceded by a downward spray of two per cent menthol to render the larynx less sensitive to manipulation with the syringe.

Dr. Richards added that some years ago he used oils of one kind or another, and instructed his patients to use nebulizers. He had reached the conclusion that oils are nearly valueless. It was better to employ something corresponding as nearly as possible in specific gravity to that of the normal serum.

Dr. Thompson, in closing the discussion, said that when Dr. Harris sent out his circular letter asking for suggestions concerning this meeting, he thought it wise to have several papers concerning the treatment of the diseases of the upper air passages. Dr. Beck agreed to discuss the scientific side, while he took the therapeutic side of the question. He had endeavored to discuss the matter from the point of view of everyday practice. The most important point, and one which he would reiterate, was expressed in the opening sentence of his paper: "One-half of all the diseases it is our daily work to treat, are curable by medicinal means alone."

Dr. Beck, in closing the discussion, said about five per cent of his cases were amenable to nonsurgical treatment. He had reference to diseases of the upper respiratory tract, not to the trachea.

Tuberculosis of the Middle Ear.

Dr. H. H. Briggs, Asheville: The frequency of tuberculosis of the middle ear in persons suffering from tuberculosis elsewhere in the body has been placed at twenty-five per cent. Of fifteen hundred school children examined by Westmacotte, two per cent were found to have tuberculosis of the middle ear. The disease is probably of far greater frequency than statistics show, and the true diagnosis is often mistaken because its onset is so insidious that attention is not easily called to the condition and no observation is made. Moreover, when the case presents itself the condition usually has passed from that of a pure tuberculous process and becomes a mixed infection, the symptoms of the suppurative condition masking the true nature of the initial disease. The careless manner of classifying all discharging ears as suppurative otitis media, without recourse to the microscope or inoculation tests, is unfortunate.

The middle ear must be regarded as belonging anatomically and bacteriologically to the upper respiratory tract, as insisted upon by Goldstein, who considers primary tuberculous infection of the middle ear of respiratory origin.

Among the predisposing factors may be classed general debilitating diseases, the hereditary influence of tuberculosis, syphilis, association with tuberculous individuals, unhygienic environment, overcrowding, poor food, cachexia—in short, any condition of surroundings or constitution which induces a lowering of the systemic power to combat infection. Among the predisposing causes of more immediate influence may be regarded (1) the existence of a tuberculous lesion elsewhere in the body, especially pulmonary tuberculosis with cavitation, and tuberculous disease of the glandular system; (2) abnormal conditions of the upper respiratory tract, including the presence of nasopharyngeal adenoid growths which have been shown by microscopic examination and inoculation tests to be the frequent seat of a latent tuberculosis; (3) infancy and childhood offer a predisposition for various reasons.

The channels of infection are: (1) Mechanical, through the eustachian tube, either air borne or introduced into the tympanic cavity by the aid of particles of mucus or foreign matter during the acts of swallowing, coughing, sneezing, or blowing the nose. (2) Infection along the eustachian tube by other than mechanical means. (3) Through the blood channels. (4) Through the lymphatics. (5) Via the external auditory canal. (6) By extension of an intracranial infection through the internal auditory canal, fallopian canal or the labyrinth. This is mentioned as merely a possibility.

To the author the mechanical theory of infection, especially secondary, seems simplest, easiest and most probable in the great majority of cases. The greatest number of cases occur in early childhood and advanced phthisis, when the conditions favorable to the mechanical passage of infectious material through the eustachian tube are at their maximum.

Clinically two rather distinct forms of tuberculosis of the middle ear manifest themselves—acute and chronic. In each may be found all the changes, from slight infiltration of the mucous membrane to extensive necrosis of the temporal bone. Rapid loss of tissue is characteristic of the acute form, resulting from ulceration of the tubercles throughout the mucosa. In the chronic form the process runs an asthenic course, and infiltration, caseation and necrosis follow less rapidly and with more characteristic tuberculous sequence.

The essential symptom which differentiates tuberculous otitis from other forms is the absence of pain. Even though the destructive process is rapid and the appearance of the membrana per se simulates an acute purulent otitis there is seldom any complaint of pain.

In determining the diagnosis, the family history should be carefully considered with regard to tuberculosis, and the patient's habits, residence, and environment should be ascertained to determine whether there has been an undue exposure to tuberculous persons or unhygienic surroundings. Facial paralysis, especially in children, occurs in one-third of the cases, against one to two per cent in nontuberculous conditions, and is of special diagnostic significance. The sanious and foul condition of the discharge, especially when particles of bone are incorporated, excites suspicion. Marked impairment of hearing, absence of headache, occurrence of hemorrhage, are considered by some as diagnostic points. Tuberculin injections and blood pressure changes (hypotension) are also considered. The only positive means of diagnosis, however, are: (1) Finding microscopically in the discharge or granulations the tubercle bacillus, or (2) giant and epithelioid cells and caseation in the tissue; (3) by experimental inoculation, reproducing tuberculosis.

The prognosis is, as a rule, unfavorable.

The treatment naturally divides itself into hygienic, dietetic, medical, and surgical, as the case indicates. The use of tuberculin has proved so successful in so many forms of tuberculosis that no tuberculous process in any way localized can be considered invariably to contraindicate its use. The author could see no reason why it should not be indicated and of decided value in properly selected cases of tuberculosis of the middle ear.

DISCUSSION.

Dr. Frank R. Spencer, Boulder, mentioned a method of making the diagnosis of tuberculosis of the middle ear, consisting of cleansing the canal first, introducing an aspirator which he had brought from Berlin, aspirating, and injecting the pus into a guinea pig. The pus, when aspirated, might not show tubercle bacilli, but the organisms could be positively demonstrated after the injection into the guinea pig by the examination of the animal's organs several weeks later.

Corrective Rhinoplasty.

Dr. Lee Cohen, Baltimore: Where the nose has been partially or completely destroyed by disease or trauma, the individual so disfigured is not only an object of pity, but is not accorded the privileges in the social and commercial world enjoyed by other persons. Since the appearance of Tagliacozzi's work, in 1597, rhinoplasty for the relief of such conditions has been an accepted surgical procedure. For some reason, however, corrective rhinoplasty has not received the attention which it merits. Rhinologists in general have shown but little inclination to develop this line of surgery, although the feasibility and advisability of the work have been proved by the excellent results obtained by Roe, Joseph, Berens and others for a number of years past. This indifference may be due to the fact that there has been absolutely no systematic treatise on this work until the appearance of Joseph's article in the German Handbuch about a year ago. An operator, however clever, might lack sufficient originality to develop a proper technic along these lines, in the absence of such literature.

Previous to the appearance of Roe's publications only methods calling for skin incisions were described as applicable to external nasal deformities. Credit should always be given to Roe as the originator of the subcutaneous method.

The deformities considered are divided into two classes: (1) Idiopathic or congenital; (2) acquired. To the former belong the overdeveloped nose, hump nose, congenital saddle and pug nose, while to the latter belong all sorts of grotesque alterations in shape and position of the nose caused by fracture or dislocation, and by destruction of the bony or cartilaginous framework from syphilis, tuberculosis and lupus. For practical purposes a further subdivision is generally made into deformities affecting the bony and those affecting the cartilaginous portions, although both are frequently involved at the same time. The various types of deformity have been admirably described by Roe, whose classification seems the most comprehensive.

In all methods of correcting these deformities, the main object should be to avoid marring the subsequent appearance of the nose by scar, or, in other words, to work entirely from within. For these subcutaneous operations incisions, as first advocated by Roe, should be made within the vestibule of the nose, generally above the lower lateral cartilage of the left side, and subsequently, if necessary, on the right side, cutting through the mucous membrane and the cartilage to the under surface of the skin. Whether this incision is made close to the septum or more laterally depends on whether it is desired to alter the line of the nasal dorsum only, or whether the nasal processes are to be severed from their attachment to the superior maxillary. It is surprising to see with what ease one can, with a very small straight knife, undermine the skin over the entire nose through a small incision on one side, owing, of course, to the flexibility of the cartilaginous portion.

By following the course of the knife under the skin with the index finger on the outside, it is not difficult to avoid injury to the skin. The skin having been undermined, one proceeds with the subsequent steps of the operation, working under the skin as if it were a tent, and guiding the movements of the various instruments with the left hand over the outside of the nose. The technic for the correction of the various conditions named is given in detail, and a number of cases reported.

DISCUSSION.

DR. JOHN O. ROE, Rochester, said Dr. Cohen's paper is a verification of the old saying that "imitation is the sincerest flattery."

Continuing, Dr. Roe said: "I am sorry, indeed, to see that Dr. Cohen is inclined to give me scant recognition as the originator of subcutaneous plastic surgery in the correction of nasal deformities, for it must be recognized and distinctly understood that this method of correcting nasal deformities subcutaneously originated entirely with me.

"In describing the method of making the initial incision from the interior of the nose, Dr. Cohen says: 'For these submucous operations, the incision as first advocated by Roe should be made within the vestibule of the nose.' I wish to say that this method was not simply advocated by me but, as a matter of fact, was originated by me. It is my method which Dr. Cohen has copied from start to finish, without the courtesy of giving credit for it.

"Dr. Cohen on one occasion had the privilege of witnessing my work, which I am always glad to show my confreres, and which, as he stated at that time, was the incentive that gave him his special interest in the correction of nasal deformities. The second case that Dr. Cohen mentions in his paper—the case of the congenitally oversized nose, causing the young man so much annoyance and mental distress—Dr. Cohen had the courtesy to refer to me, and came with the patient to my office to see the operation, which I performed at that time in his presence on May 30, 1912. In connection with this operation he saw the distinct method of elevating the skin or 'undermining' it, as he chooses to term it, the forms of dressing necessary in these cases, the use of my saddle splint, which I have used from the beginning of this work.

and the method of holding it in place with the strap of adhesive plaster across the face, the use of the strips or pieces of adhesive plaster under the saddle, one placed above the other, in order to produce extra pressure at points where necessary, the making of the nose narrower by the removal of cartilage and bone, and by fracture, the shortening of the nose by taking out a sufficient amount of the cartilage of the anterior portion of the septum and of the alæ, and stitching the projecting part of the nose back as far as necessary to correct the deformity, and the use of the sling of adhesive plaster to draw up and support the end of the nose after operation. All of these points and others, in the management and technic Dr. Cohen had the opportunity to see and to learn about, for all of them were employed on this patient, whose case was a complicated one. In this case also the nose was altogether too high, and had to be cut down, and the method by which it was done Dr. Cohen has had the discourtesy to give credit to Joseph of Berlin, whereas the same operation was described and illustrated by me in an article on 'The Correction of Angular Deformities of the Nose by a Subcutaneous Operation,' and published in the *Medical Record*, New York, July 18, 1891, which was seven years previous to any published article by Joseph on this subject.

"It would have done Dr. Cohen no harm to have had the courtesy to mention the facts as above stated instead of leading the reader to infer that these methods were largely his own methods and thereby indirectly trying to appropriate them to himself. Joseph of Berlin is also quite in line with the European Germans, many of whom ignore American authors, although quite willing to appropriate their work.

"The technic which Dr. Cohen has collected and described in his paper, however, applies only to the correction of angular deformities of the nose, which he chooses to call 'hump nose,' or to the correction of unduly large or 'oversized' noses, as he designates them, and to deviated noses, the extent to which he has pursued the subject up to the present time. The other varieties of deformities, those attended with depressions and other distortions of the nose, he will find much more difficult."

In emphasizing the fact of having originated the method of correcting nasal deformities by operation subcutaneously performed, Dr. Roe further said: "It does not matter what modifications may be made in the operation in any particular case —whether the operation is done by cutting up or cutting down, with a knife, with bone scissors, with a saw, with a chisel, or with whatever instrument or instruments that can be most advantageously employed in that particular case, the fact remains that the subcutaneous correction of nasal deformities is a method which I have the honor, if honor there be, to have originated and first employed. This fact should not, as a matter of professional ethics, be ignored or appropriated by another without due recognition."

Dr. Cohen, in closing the discussion, said he had no intention, in his references to Dr. Roe's work, of detracting therefrom. He insisted, however, that there was no systematic description of this work prior to that mentioned in the paper. He had operated upon about ten cases before he ever saw Dr. Roe operate.

The Efficacy of Vaccines in the Treatment of Chronic Diphtheria Carriers.

Dr. Arthur I. Weil, New Orleans: The occasional persistence of the Klebs-Loeffler bacillus in the throats and noses of patients for weeks and sometimes months after their complete clinical recovery, has been a source of annoyance and concern to everyone who has had to deal with diphtheria patients. The necessity for complete isolation of such patients as long as the organisms in virulent form are present, self-evident though it is, entails a serious loss of time and inconvenience to the patient. This is true of not only those carriers who have just recovered from an active diphtheria, but likewise of that other class in whom, though they have never had an active diphtheria, nevertheless, either through contact with diphtheria patients or otherwise, the Klebs-Loeffler bacilli are present. The necessity for isolation is just as great, and the presence of the germ just as persistent, as in those who have actually suffered from the disease.

It is the eradication of the diphtheria bacilli from the nose, throat and ears of both classes of carriers, and the resultant stamping out of a diphtheria epidemic in a public institution, an orphan asylum, that forms the basis of this communication.

After a year or more of sporadic outbreak of the disease, constantly recurring in spite of the most careful isolation of the diphtheria patients, twenty-four cases finally remained in the isolation wards of the infirmary in which all the active cases had been treated. The patients were classified in three groups: (1) Those who, having had an active diphtheria infection, had been clinically well for a period of two weeks or longer, but in whom live diphtheria bacilli were still found in the cultures. The period during which a positive culture had persisted after complete clinical recovery varied from three months to something over two weeks. There were nine of these patients, who were considered chronic active carriers. (2) Those in whom, though they have never had an active diphtheria, the culture showed the presence of diphtheria bacilli. It is impossible to know just how long they had been carriers, since the bacilli were found in routine examinations of all children in the institution. There were twelve of these, and they were considered chronic passive carriers. (3) Those who had an active diphtheria infection, but in whom less than two weeks had passed from the time of their complete recovery to the beginning of the vaccine treatment. This group comprises three patients, who are called active carriers. Of the three active carriers comprising group 3, in one case ten days and in the other two about one month elapsed between their complete clinical recovery and the last positive culture. Their period of terminal isolation, accordingly, did not seem to be diminished. The cases, however, are too few to allow any definite conclusions to be drawn.

In drawing conclusions as to the value of the vaccine treatment in the twenty-one chronic carriers, the possibility must not be lost sight of that many, if not all, might have cleared up without the use of vaccines. In view of the fact, however, that practically all the cases showed a marked diminution in the number of bacilli present shortly after the treatment was begun, and that all of them eventually did clear up with large doses, the belief would seem to be justified that the vaccines are of some value. At any rate, it has been shown that large doses of diphtheria vaccines can be used without the slightest inconvenience to the patient. From the author's experience, large doses give better results than small ones. Whether autogenous or stock vaccines are the more useful is a matter of opinion.

NEW YORK OTOLOGICAL SOCIETY.

Regular Meeting, Tuesday, May 28, 1914.

THE PRESIDENT, DR. ROBERT LEWIS, PRESIDED.

Mastoid Opened for Relief of Pain.

DR. STEPHEN H. LUTZ reported two cases of mastoid pain, worse at night. The first was a girl of fifteen years, where, after trying various topical and internal remedies, the mastoid was finally opened and the pain relieved. The drum and hearing were normal and no disease was discovered in the bone. The second case resembled the first in most particulars. Both cases were more or less neurotic, but the pain was severe enough in both cases to make the patient miserable from loss of sleep and the long continuance of the trouble. The pain was relieved so rapidly and so completely that Dr. Lutz feels sure, under the same circumstances, he would operate earlier. To save pain for several weeks it is certainly worth trying even as severe a measure as a mastoid operation.

DISCUSSION.

DR. WHITING inquired if the same result could not have been secured by an incision of the periosteum. Dr. Lutz replied that such an incision had been made without permanent results.

DR. BERENS spoke of a similar case in his own practice where, upon opening the mastoid, the picture which he described as one suggesting stalagmites and stalactites was found. The pain in his case was relieved by the operation.

DR. WHITING spoke of a case, at one time under his care, of a woman who had persistent mastoid pain and who had insisted upon the mastoid being opened. Cupping was all that was done. This after a time relieved her of her symptoms. He would not favor opening up the mastoid in the presence of normal hearing and a normal drum.

DR. KERRISON referred to a case where pain of long duration in the mastoid was relieved by Wilde's incision.

Pain, Tinnitus and Deafness With Sensation of Foreign Body for Four Years.

Dr. Bryant reported a case diagnosed by him as otosclerosis. The patient was a student, a woman twenty-eight years of age, who had pain in her ears, tinnitus and deafness, and a sensation of a foreign body in the ears for the last four years. Examination showed nothing abnormal about the middle ears, except blush on the promontories. The eustachian tubes were open. There was a retraction of high and low limits of tone perception, and a prolongation of bone conduction. General treatment of a hygienic character and local treatment to the nasopharynx relieved her of her symptoms.

DISCUSSION.

Dr. Haskin said that he had seen a similar case where the blood examination showed a positive Wassermann.

Dr. Harris and Dr. Phillips questioned the diagnosis.

Dr. Bryant, in reply to Dr. Rae, said there was no fixation of the stapes.

Mastoiditis With Subperiosteal Abscess.

Dr. William H. Haskin reported a case of mastoiditis. On January 3, 1912, the nose was operated upon, as a result of which the septum had an oval perforation of one inch by three-fourths of an inch, and was full of hard crusts. Following the operation the patient had O. M. A. P. in the right ear, which discharged continually up to the time of his first visit to the Manhattan Hospital on March 3rd. Dr. Rae at once diagnosed mastoiditis with subperiosteal abscess, and assigned the patient to Dr. Haskin for operation. Cortical perforation was found over the angle of sinus, and as process was badly disintegrated, what was thought to be a complete removal was done. All pain and temperature subsided and wound began to heal rapidly, except that pus escaped from a point just behind the aditus at each subsequent dressing. An autogenous vaccine was made (staphylococcus aureus), but in the meanwhile a swelling began below the ear which gradually spread, becoming hard and edematous, until it reached the clavicle. Having begun the vaccine, Dr. Haskin persevered and did not resort to operation until April 13th. He then opened behind the sternoarytenoid muscle and found pus in large quantity, with a cavity large enough to insert his two fingers, and he could feel the clavicle below and the skull above. Large rubber drainage tubes were inserted above and below through the one opening, which was only about one and one-half inches long. To his surprise, there was very little discharge on the following day. In four days he had removed both tubes, and within fifteen days the wound had completely closed, there being no discharge at any time. The vaccine was given regularly, and to it must be given the credit for this remarkable cure. The mastoid wound healed in four weeks, and on May 10th he had had no pain or swelling, had gained twelve pounds in weight, and the ear appeared normal.

DISCUSSION.

DR. BRAISLIN reported a case of mastoiditis with symptoms referred to both ears, and suggesting a beginning infection of the lateral sinus, in a child of six years. She had been ill with an indefinite ailment for six weeks, having during the latter three weeks lost weight decidedly; had become pale and irritable, and displayed an irregular febrile tendency, her temperature varying from about normal to, occasionally, 101° F. She had been operated on for hypertrophied tonsils and adenoids, two days before the morning when she was first seen by the reporter, and on the day she was first seen she had had a chill followed by a temperature of 104°. It was ascertained that previous to this time she had occasionally complained of slight pain in both ears, but mostly the right. Neither ear had discharged at any time during the illness. Certain isolated lymphatics on both sides of the neck were sufficiently prominent to be recognized without the aid of the fingers. The right mastoid was somewhat tender to pressure, the left not at all so. A diagnosis of right sided mastoiditis was made with presumed involvement of the corresponding sinus. Operation was at once done upon the right side, which showed diseased bone, the knee of the sinus very far forward, so that part of the posterior bony auditory canal had to be cut away in order to reach the antrum. Pus was present throughout the bone and in contact with some firm granulations on the dura, covering the sinus wall. These were not greatly disturbed. The sinus was elastic under pressure, but was rather widely exposed in case symptoms indicated need of opening it later. The temperature had kept below 100.1° for three weeks subsequent to operation. Six days after operation the glands on both sides of the neck being but slightly if at all diminished, a dose of autogenous streptococcic serum was given, since which the glands are noticeably smaller. Healing of the wound has progressed rapidly.

Dr. Gruening questioned the accuracy of Dr. Haskin's conclusion that the prompt healing of the wound was due to the vaccine.

Dr. Haskin spoke of a second case under the care of Dr. Kerrison, which had been operated upon for mastoiditis. The swelling in the neck had been treated with much benefit by means of the autogenous vaccine, after other treatment had failed.

Dr. Kerrison said the case was a baby of thirteen months, who had been operated on by him three months before for an extensive disease of the mastoid. The bone was involved up to and including the portion of the squama, which was quite black. The glands of the neck were much swollen. Two weeks later a radical operation was performed. The post-auricular wound healed only after some time. Later two of the glands broke down and were opened by him and pus evacuated. Dr. Dwyer then took the case for vaccine treatment. The only change in the condition was that instead of a single large mass, the glands were now to be differentiated, the wound behind the ear looked no better. Pus was seen still to be forming.

Dr. Duel referred to the value of the von Pirquet test in children.

Dr. Haskin said this test had not been made in this case.

Dr. Phillips said he had reported two similar cases in children, which had proved to be tubercular in nature.

Dr. Haskin, in reply to the question of Dr. Lutz, stated that the infection was of a staphylococcic nature.

Dr. Berens suggested syphilis as a possible cause. He had seen such a case.

Dr. Gruening doubted whether the vaccines were of any value in such cases, and thought we must still proceed to do otology on a clinical and not a laboratory basis.

Dr. Whiting expressed surprise at the early destruction of the incus in this case.

The Effect of Salvarsan Upon the Acoustic Nerve.

Dr. Toeplitz spoke of salvarsan in its effect upon the acoustic nerve, referring to the reports from the Vienna clinics, and his own investigations, which show no neuropathic effect of salvarsan, in contradistinction to those of the Vienna clinic, the many disturbances of the acoustic nerve of which stand alone in this respect.

DISCUSSION.

Dr. Duel said that two meetings before, he had presented a patient where deafness had followed the use of salvarsan, and that he had at that time gone to some length into the statistics quoted by Dr. Toeplitz.

Dr. Dench spoke of a case of syphilis where the injection of salvarsan had been followed by deafness in one ear. He gave as his opinion in this case, that the deafness was due to an insufficient dose, and had advised a repetition of the injection. He promised to report the result at a subsequent meeting. He referred to the paper by Dr. Fordyce, read before the Section on the Eye, Ear, Nose and Throat, at the recent meeting of the Medical Society of the State of New York, in Albany, in which he advocated perfected technic as a means of preventing untoward results.

Supplementary Report in a Case of Total Deafness.

Dr. McKernon made a supplementary report in a case of total deafness reported at the March meeting. The patient, a boy, had suddenly become totally deaf. Examination showed the drum membranes black in color. There was a history of suppuration from the ears two years before. The Wassermann reaction was negative. The boy was put to bed and given hypodermic injections of pilocarpin in from one-sixth to one-half grain t. i. d., and strychnin, one-fiftieth to one-fifteenth grain. In four weeks' time the hearing was restored. In six weeks the drum membranes became normal. The vertigo complained of disappeared at the end of the second week. There was no moisture in the middle ear.

DISCUSSION.

Dr. Lutz inquired as to the presence of a clot in the middle ear.

Dr. McKernon replied that he did not think any clot was present.

Dr. Dench spoke of an old gentleman who had come to him absolutely deaf in one ear, where the hearing was restored in inflation.

Dr. Haskin raised the question of hysteria.

Dr. McKernon replied that two neurologists had seen the boy and had carefully examined him with this in view, and both had positively excluded it.

Pain in the Ear and Over the Mastoid in Conjunction With Appendicitis.

Dr. Phillip D. Kerrison spoke of a case that he had seen recently in consultation. The patient had been operated upon for appendicitis and was complaining of pain in the ear and over the mastoid. There was a history of an old middle ear suppuration. At the present time there was no discharge from the ear. There had been pain in the mastoid before. He had given the opinion that the pain was not due to any inflammatory disease in the mastoid.

DISCUSSION.

Dr. Phillips thought it might be a case of eburnating mastoid.

Dr. Dench said that he had seen a girl with pain in both mastoids with normal drum membranes. The X-ray had shown a displaced wisdom tooth on each side. In another case there was pain in the mastoid, and examination had shown a cavity in a tooth. In both cases the pain was cured by attention to the teeth.

Labyrinthitis Following Mumps.

Dr. Wendell C. Phillips reported a case of labyrinthitis in a boy of eighteen following mumps. There had been vertigo and a high temperature for two weeks. He was totally deaf in one ear. For a time he was partially unconscious. The hearing had not improved in the affected ear.

DISCUSSION.

Dr. Page inquired whether any gentlemen present had seen the hearing clear up when affected by mumps.

Dr. McKernon and Dr. Dench said that they had seen cases where it had improved, but no cases where it had become entirely well.

Meningitis Following Fracture of Skull.

Dr. Eagleton reported two cases of meningitis, the first following fracture of the skull; the second, probably tubercular in nature. He had operated according to the method recommended recently by Dr. Haynes, and could confirm Dr. Haynes' statement that the cerebellum would in this operation not prolapse into the wound. The usual rigidity following operation on the brain is not seen following this operation. Both patients were alive, and although they probably will die, he felt that the operation was a decided advance in brain surgery.

DISCUSSION.

Dr. Dench said that he had recently operated on a case by the Haynes method which was still alive. There was considerable rigidity. He said that the operation was not a new one. It was described a number of years ago in Cunningham's "Anatomy."

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, April 21, 1914.

DR. OTTO J. STEIN, THE PRESIDENT, IN THE CHAIR.

Case of Singer's Nodule on the Vocal Cord.

DR. GEORGE E. SHAMBAUGH presented a patient from whom he had successfully removed a singer's nodule from the vocal cord. The patient was a clergyman, and had been troubled with hoarseness for about three months, which interfered very much with his speaking voice. The nodule was about the size of a pinhead and was located on the usual spot for these nodules, that is, at the junction of the anterior with the middle third of the vocal cord.

Dr. Shambaugh showed the instrument which he has used in several cases to remove these nodes. The ordinary forceps are entirely too clumsy for this work, and the use of cauterizing substances is obviously dangerous.

Such nodules often develop rather quickly, as illustrated by a public speaker whose voice became affected during a reelection campaign, and in another case cited, where the defect had followed the excessive use of the voice during a football game.

There is a tendency for the nodes to disappear spontaneously, but very often they will persist indefinitely until removed in an operative way.

Case of Frontal Sinusitis and Ethmoiditis With an External Fistula.

DR. SHAMBAUGH also showed a case of a young lady who was referred to him because of a fistula about one-quarter of an inch above the inner canthus of the eye, which had existed for seven weeks. The development of the fistula followed six weeks of severe headache, which had been treated as a frontal neuralgia. She gave as the cause of her trouble an accidental kick from a child's shoe six weeks before her headache developed. The maxillary sinus on that side was quite dark. Both frontal sinuses were small, as was shown by the X-ray plate. and the transillumination, for this reason, gave very little difference on the two sides. A removal of the middle turbinate body and exenteration of the ethmoid labyrinth gave a free passage into the frontal sinus. The discharge from the fistula ceased immediately after the operation, and the case went on rapidly to complete recovery.

DISCUSSION.

Dr. E. L. Kenyon wished to speak especially concerning the case of apparent singer's nodule mentioned by Dr. Shambaugh as coming on after scarlet fever. Ordinarily, singer's nodules are dependent upon misuse or overuse of the voice. In the case referred to a nodule appeared following scarlet fever, on the cord, but in the usual place of the singer's node. There may be important significance in this, because many years ago Fränkel discovered a little gland on the cord, not regularly, but at times, which was situated between the middle and anterior third of the cord. Later, Imhofer, of Prague, in three cases of singer's nodes saw a secretion coming out from a gland in this particular region, thus confirming Fränkel's discovery. It seems that singer's nodes from this latter glandular cause are in contrast to the more usual non-inflammatory type, accompanied by a local inflammation. The local inflammation produces an inflammation of the gland, hypersecretion of the structure, and by the closing up of the duct leading outwards, a swelling on the cord is produced. That is a very important fact to know, from the standpoint of the singer. Many of the people with these nodes have voices worth many thousands of dollars, and they must be handled with extreme care. If you cauterize a node due to such a glandular inflammation, you are almost certain to prevent recovery, because you are liable to close up the duct of the gland. If you operate, you are very likely to do the same thing. Clinically, it seemed to Dr. Kenyon, that he has never seen one, to know that it was of this type, but it is stated that this particular form of singer's node has a flattish contour, and, clinically, that it almost always gets well simply by rest of the voice. The speaker thought it well to bear that fact in mind, since the case mentioned had followed a disease which could easily have produced inflammation of the vocal cords.

One must bear in mind that singer's nodes may recur, because the condition is due to misuse of the voice. The important thing is to correct the manner of handling the voice, so that the cause for the formation of the nodes shall be done away with.

Dr. Otis H. Maclay was interested in the frontal sinus case especially, owing to the fact that it was a chronic case and was cured by intranasal work. This case would indicate what he always believed, namely, that in these cases of frontal sinus trouble it is well to do all we can intranasally before undertaking the external operation. He reported a case seen by him in which there was a large mass of pus in the forehead and a denuded area of bone. There was no external opening, but you could feel when the pus was relieved that there was bone necrosis. Good drainage was obtained through the nose. A small incision was made in the skin under gas; the pus poured out. In a couple of days there was no drainage from the external wound. The intranasal work consisted of removal of the anterior portion of the middle turbinate and the anterior ethmoid cells, and a liberal enlargement of the nasofrontal duct.

Dr. Joseph C. Beck said that he would interpret the X-ray picture shown by Dr. Shambaugh as indicating an ethmoiditis. It is very easily shown that the ethmoidal cells and not the frontal are involved. Removal of the turbinate and cleaning out the ethmoid would clear up the condition.

In reference to the singer's nodes, he has recently removed two by means of the suspension method, which has proven satisfactory in his hands. These nodes are very easily removed with an instrument similar to that described by Dr. Kenyon. With such an instrument you just get the edge of the node, and it is impossible to go any deeper.

Dr. Charles H. Long asked Dr. Shambaugh, or anyone else who had had experience with these growths, if they had ever used fulguration?

Dr. O. J. Stein said that he had used fulguration, with no satisfaction.

Dr. R. H. Brown cited the case of a man, seventy-five years of age, who had a sinus affection similar to that in the case reported by Dr. Shambaugh. This had been discharging externally for some time. He was rather old for extensive operation: however, some of the middle turbinate was taken away. A large polyp was found and removed, leaving the ethmoid cell from which it grew. This was followed by a good result. It was plainly a case of anterior ethmoidal cell disease. The discharge continued internally, but never broke externally again during the five remaining years of life.

Dr. J. R. Fletcher cited a frontal sinus case. About two years ago a lawyer was sent to him with an orbital abscess. The pus was coming from the upper eyelid. He had a history of having swelling there three or four times before, and had been under treatment for about six months. The speaker washed the frontal sinus, and asked for an X-ray picture, but the man did not seem to think it necessary. Finally, with a probe entering here (indicating), it went in such a short distance that he could not understand it. He probed into the frontal sinus, and could not meet the end of the other probe. He started again and went in for a short distance and met it. So he came to the conclusion that he had an ethmoidal bulla to deal with. He got absolutely nothing out of the frontal sinus two or three times. He could go a relatively short distance, and by bringing the probe out and going just a little behind it, he could go a much greater distance. He then washed that out with simple bluing to see whether there was actual communication, or whether he had deceived himself by finding denuded bone. The probe was a cannula. Through that he passed this ordinary bluing water, and it came out through the nose. The anterior end of the middle turbinate had been removed before he came to the speaker. He simply mentioned these bullæ, because we must remember the two kinds—the ethmoidal bulla, which is attached to the frontal plate, and the bulla frontalis, which is attached to the cranial plate.

Dr. Shambaugh, in closing, stated that the instrument with which he had removed the nodes from the vocal cords was small enough to be placed between the vocal cords, as suggested in the remarks by Dr. Kenyon.

As to the question whether in the second case presented there was any frontal sinus disease, Dr. Shambaugh pointed out that because of the small sinus, the X-ray plate and transillumination were deceptive, since neither gave any clear indication of frontal sinus trouble, and yet on introducing a cannula and irrigation, pus was washed out of the frontal sinus.

Brain Cyst.

Dr. H. Kahn presented a case of brain cyst, which had been operated, and presented two points of interest: First, the long standing period of the disease; second, the help of the X-ray in diagnosing the condition. This latter point was in opposition to a statement once made by Dr. Beck, that he never had any help from the X-ray. Dr. Kahn did not know whether the X-ray was absolutely conclusive or not, but it was of great assistance in this case. The man was twenty-five years old. When nine years of age, while driving, he struck his head and apparently suffered from a fracture of the skull. He was operated for this, so he says, but no evidence of such operation could be found at the present time by the speaker. From then up to the time when first seen the man had several attacks of otitis media, for which he was treated. He came to the hospital about the 3rd of December, complaining of excruciating pains in the ear and right-sided headache, and was admitted to Dr. Kahn's service. This headache was definitely located on the right side, from the back of the neck to between the eyes. Very sensitive to touch and pressure. At that time temperature was normal, pulse 72 to 76. The ear showed a small pin point opening in the inferior posterior quadrant, with pus pulsating under pressure. A paracentesis was performed, which did not seem to relieve the symptoms. The headache and pain both continued. In addition, he had a nystagmus to both sides. On washing out the ear with hot water the nystagmus was uninfluenced; cold water gave a very strong and pronounced nystagmus to the left. He was kept under observation for four or five days, when suddenly one day, while in bed, he became very cyanotic and very dyspneic; the pulse became weak and thready for a little while. When he came out of this attack the headache was very intense on the right side. He had three or four similar attacks. Two X-ray plates were made, with hope of finding what was in the mastoid, which was thought might be at fault. The frontal view showed a sclerosis of the mastoid above and a line below, showing a large terminal cell and a dark area in the brain shadow. Those findings were verified at operation. Dr. Fletcher came in consultation at that time, and pointed out this mastoid cell. The second plate was rather difficult to read. It was taken at an angle, showing the mastoid with a black area above. A few days after these pictures were taken a radical mastoid was performed, showing the condition of the mastoid, as read in the picture by Dr. Fletcher. The brain was exposed and a needle was inserted in an upward forward inward direction, as indicated by the dark area of the X-ray plate, and a syringeful of thin fluid was withdrawn which on culture was found negative after six days, showing no organisms at all. Differential count showed thirty-six polymorphonuclears and fourteen mononuclears; no Gram positive organisms shown. The wound was left open, and in a couple of weeks it was healed up. It was not thought wise to open the cyst at the time of the mastoid operation, for fear of infecting the brain. At the end of a month the patient returned with the same symptoms of headache, nystagmus, and so forth. After three or four days in the hospital a lateral opening was made, the bone was drawn back, showing absolutely no pulsation of the brain. A needle was inserted, yellowish brown fluid was withdrawn, and immediately pulsation of the brain followed. On slipping back the dura the vessels of the brain were found very large and varicosed. It was impossible to make an incision into the brain without great hemorrhage. A trapdoor opening was made, about one inch by two inches, and in spite of hemorrhage the speaker introduced his finger and found the cyst to be about three by two and one-half inches in size, apparently multilocular, with a large multilocular area above. Hemorrhage was very great, so the wound was firmly packed, leaving a strip of vioform gauze for drainage. The packing was left in for twenty-four hours, when it was removed gradually, and at the end of forty-eight hours it was all out. Apparently, the patient is cured—at least, up to the present time. Whether the cyst will refill or not, the speaker could not say. All the symptoms disappeared except a slight nystagmus to the right. The other symptoms have all disappeared entirely, and the patient appears to be in good health now.

The speaker forgot to say that the tuning fork showed the Weber to the left—the good ear—high tones apparently not heard; Schwabacher not heard; somewhat shorter Rinné.

DISCUSSION.

Dr. J. R. Fletcher said the interesting point about the case to him was that it was a middle fossa abscess, which Dr. Kahn had omitted mentioning. In spite of that, the man had a nystagmus. The nystagmus was attributed to the size of the cyst, making indirect pressure upon the cerebellum. The patient had an exaggerated patellar reflex on the same side. Another important thing was that the man had had several of these attacks previously, consisting of lowering of respirations, lowering of temperature and subnormal and lowered pulse. When Dr. Fletcher first saw him the pulse was 85, respirations 14, and temperature 97°, which was practically normal. One other interesting feature about the case was that it was possible to make a diagnosis of latent abscess. Nothing could be seen. The speaker's idea was that sixteen years before, this man had had an abscess in the middle fossa, and that it was at present in the period of latency; that these attacks were explained on the basis of hemorrhage into the abscess, or into the area of the cyst—which it turned out to be. Blood was found in the first puncture.

Dr. J. Holinger asked if there was any pus shown at any time, or was the contents of the cyst or abscess not simply cerebrospinal fluid mixed with the blood? The whole history seemed to him to be somewhat similar to one that he was much interested in. He had made a diagnosis of brain tumor from the tuning fork findings four years ago. The patient had been getting along very nicely for four years, after a decompression operation, but again had attacks of dizziness, severe headache, and her sight and hearing grew worse. A second operation had to be performed. The same flap as that used at the first operation was formed. The intracranial pressure was less than at the first operation. As soon as the flap was down, a cyst the size of a hen's egg showed, and a large amount of cerebrospinal fluid escaped. The cyst opened and it was evident then that it was the posterior horn of an enlarged lateral ventricle. The fact that Dr. Kahn's cyst was drained towards the ear does not speak against the possibility that it might have been the posterior horn. This is important on account of the therapy of the case. If this is an internal hydrocephalus, it will fill up again; it will have to be permanently drained, by inserting a small silver drain from the cyst to underneath the outer skin. The cerebrospinal fluid, which is produced in too large quantities, causes these enlargements. It will be led outside of the skull cavity and will be absorbed in the tissue outside of the skull, and intracranial pressure cannot rise again.

Dr. Julius Grinker, on invitation, simply wanted to ask a few questions. First, was a lumbar puncture made, and, if so, what was the finding? Second, he would like to have an exact description, topographically speaking, of where the cyst was really found and opened. Third, is this not, after all, a meningitis serosa circumscripta, a condition which had been frequently described in connection with inflammatory conditions of the ear?

Dr. Joseph C. Beck wanted to say just a word with reference to Dr. Kahn's statement that he (Dr. Beck) had said that X-rays in mastoid cases were of no value. He believes a great deal in them. However, the round cell that was pointed out to him was, in his opinion, a broken-down mastoid cell, in contradistinction to the opposite side, which showed a number of cells. With reference to diagnosis of brain conditions, it was in such cases that he said that he had yet to see a plate that showed anything that could be proved by operation as an abscess. He could not see that the plates passed around by Dr. Kahn showed anything definitely. Dr. Beck is of the opinion that X-ray pictures show best when stereoscopically taken.

Dr. Kahn, in closing, said that he thought Dr. Beck misunderstood him. He had understood Dr. Beck to say at a meeting that he had never been helped by X-ray pictures in brain conditions. He (Dr. Kahn) had been helped somewhat, and especially in this case, because he had found the cyst in the place where the dark shadow apparently was in the plate. Of course, this was only one case.

In answer to Dr. Holinger, no pus was found in this fluid at all. It might be, of course, a lateral ventricle diverticulum, but there was the fact to be considered that it apparently was a secondary result of the traumatism years before. One thing could be assumed as well as another. The cyst may fill up again, but it would be necessary to wait to see whether it did or not. The case was presented merely to show that it had been operated, without apparent success.

Dr. Holinger said that so long as the wound is still open it would be a good plan to insert a drain.

Dr. Kahn said he was very glad of the suggestion, and would do it.

Replying to Dr. Grinker's question: A lumbar puncture was made and was negative. As to the convolutions, he could not say. The cyst was opened, incision being made directly over the external auditory meatus, and so far as the convolutions of the brain at the time were concerned, it was apparently impossible to tell exactly, on account of the varicosity of the vessels and the apparent edema about them. He did not think it could have been a circumscribed meningitis, because it was too deeply situated within the brain structure. At operation he went through an inch, approximately, into the brain structure. It was always beneath the meninges, and so he thought it would not have been of meningeal character, and must have been in the brain.

Case of Simple Mastoid Operation Under Local Anesthesia.

Dr. George W. Boot presented a little girl who had had mastoiditis, but was in too bad a condition to be given a general anesthetic, and it was necessary to operate under local anesthesia, namely, one per cent novocain. She stood the operation very well, made very little complaint of pain—only when going through the soft tissues.

Thrombosis of Superior Longitudinal Sinus.

Dr. Boot also showed a specimen from a young woman who was taken sick with symptoms pointing toward suppurative otitis media.

M. H., female, aged twenty-two years, single, university student. Admitted to the German Hospital on June 3, 1911, in an unconscious condition. Patient had a cystitis on admission, for which she received boric acid irrigations of the bladder. Her temperature was 102°; pulse, 80; respirations, 22. On June 4th the patient was restless, crying loudly and tossing about. She slept at intervals. Part of the time her limbs were rigid and the back of the neck painful. Temperature ranged from 101.6° to 103°; pulse, 84 to 108; respirations, 24. Blood examination gives ninety per cent hemoglobin by the Talquist scale. Whites, 14,680; reds, 4,500,000. Urinalysis gives color dark straw. Transparency clear; a deposit of heavy sediment. Specific gravity, 1022. Reaction alkalin. One hyalin cast found. Numerous epithelial cells present. Thirty-two pus corpuscles present in field of one-sixth objective. Fourteen blood corpuscles present in field of one-sixth objective. Bacteria present; spermatozoa absent; albumin present in moderate amount; sugar, none; calcium oxalate crystals numerous; yeast fungus present.

June 5th: Patient very restless; crying; biting lips at times. At 5 p. m. patient had severe convulsion; had urinated involuntarily ever since admission; menstruating. At 12 p. m. very restless; crying; throwing left arm and leg continuously. Temperature ranging from 102° to 102.4°; pulse, 80 to 120; respirations, 22 to 26. On June 6th urinalysis showed: Color, amber; reaction, acid; no casts; five to six epithelial cells in one-sixth objective; twenty-five to thirty pus cells in a field of one-sixth objective; a few bacteria; albumin present in moderate amount; sugar, none; a few calcium oxalate crystals are present; triple phosphates numerous; no amorphous deposits. At 1 a. m. patient very restless; slept about one and one-half hours during the night; drank about twenty ounces of water. At 5:36 a. m., convulsion lasting nine minutes; right eyelid twitched, then right arm and head, then leg. Left part of body remained rigid. Right arm twitched for three minutes after rest of body stopped. At 8:33 a. m., convulsion lasting thirteen minutes. At 10:33 a. m., convulsion lasting twenty-one minutes. Left side of body quiet. At 4 p. m., lumbar puncture followed by convulsion. Patient very restless. At 7:38 p. m., slight convulsion, lasting six minutes. At 10:30 p. m., convulsion lasting eighteen minutes. Patient hiccoughed during entire convulsion. Temperature on this day ranged from 101° to 104°; pulse, 80; respirations, 80 to 136.

June 7th: 2:15 a. m., convulsion lasting seven minutes and starting in right arm. 3:10 a. m., convulsion lasting four minutes and starting in right arm. Some hiccough. 4:12 a. m., convulsion. 6:13 a. m., convulsion lasting eighteen minutes; cried before and moaned during the convulsion. 10:03 a. m., convulsion lasting seven minutes. 11:10 a. m., convulsion lasting eight minutes.

Dr. Boot saw her about noon and found the drum membranes were not markedly reddened, but slightly so, and gave the appearance of those seen in a middle ear catarrh. Accordingly he did paracentesis. The trouble in this case was very obscure. The patient could not talk. She would look in the direction of those in the room, but gave no sign of comprehending anything said, and made no reply.

1:30 p. m., convulsion lasting twenty minutes. 4:30 p. m., convulsion lasting nine minutes. 6 p. m., convulsion lasting four minutes. 8:10 p. m., convulsion lasting eight minutes. 8:20 p. m., twitching, not severe; 9:30 p. m., convulsion lasting eight minutes. Temperature on this day had varied from 101° to 102.4°; pulse, from 100 to 156; respirations, from 20 to 26.

June 8th: 1:30 a. m., convulsion lasting eight minutes. 4 a. m., convulsion lasting nine minutes, during which she screamed continually. 5 a. m., convulsion lasting four minutes. 7 a. m., convulsion lasting four minutes; very restless and screaming at times. 1 p. m., convulsion lasting five minutes. 4:15 p. m., convulsion lasting nine minutes. 7:30 p. m., convulsion lasting four minutes. 10 p. m., convulsion lasting four minutes. Tossing of arms and legs continually. Temperature varied from 100.6° to 102.2°. Pulse varied from 100 to 158. Respirations varied from 22 to 28.

June 9th: 6:30 p. m., convulsion lasting six minutes. Convulsive attacks every few minutes. Noon, convulsion for three minutes. 2 p. m., slight convulsion. 9:55 p. m., death.

Postmortem Notes.—June 10, 1911: Body of a well developed young woman, said to be twenty-two years of age. Nothing abnormal was noted externally. Only the head was opened. Before the dura was opened, the brain seemed to be unusually dark. On removal of the dura, the sinuses of the vertex, the superior longitudinal sinus, the lateral sinuses as far as the mastoid on the right side, and throughout on the left side, and the torcular, were all thrombotic, as were also all the veins of the meninges of the vertex. The thrombosis and congestion were most marked on each side of the superior longitudinal fissure, and on the left side along the fissure of Rolando. About the middle of this fissure on the left side was a small amount of yellowish exudate in the meshes of the pia. Traces of a similar exudate were seen here and there lying alongside of large thrombosed veins. Most of the brain was firm, but lying parallel to the superior longitudinal fissure was an area about two by five centimeters that felt distinctly soft, as if it were a cavity filled with liquid. There was no evidence of disease of the mastoid. The foramen for the mastoid vein was larger than normal—about four to five millimeters in diameter. The base of the brain showed no thrombosis or exudate of any sort. After hardening for several days in a ten per cent solution of formalin the brain was cut in horizontal sections. The right hemisphere showed a marked area of congestion in the frontal lobe. The left hemisphere was softened throughout the frontal and parietal lobes. The congestion was most marked in the region of the insula, and the softening most marked about the center of the white matter. The softened area showed numerous points of congested vessels. The area not congested was a greenish yellow color, and appeared as if on the point of breaking down into pus. All the larger veins were thrombotic. The brain and dura with the thrombosed sinuses were put into ten per cent formalin solution for further examination. When the brain was sectioned after hardening it was found that there was a large are of softening in the left hemisphere and a smaller area in the right. It appeared as if had the patient lived a few days longer, the whole left hemisphere would have become one large abscess cavity.

DISCUSSION.

Dr. Robertson asked the speaker if he thought the trouble came from the ear or nose.

Dr. Boot replied that, so far as he could find out, it came from neither of them.

Dr. Shambaugh asked if there was the fluctuating temperature of a sinus thrombosis.

Dr. Boot replied that there were no sudden falls of temperature; no chills. The only thing to point to the source of the infection was an old cystitis.

Dr. C. M. Robertson said that longitudinal sinus thrombosis is one of the rare things found in inflammatory conditions in the brain. He thought that in this case it was probably a postmortem clot occurring near the end of the life of the patient. If she had a thrombosis of the longitudinal sinus she would certainly have been in worse condition than if she had had thrombosis of the lateral sinus, and the lateral sinus on that side would probably be thrombosed anyhow. There have been a few cases of longitudinal sinus thrombosis, but they are decidedly rare, and nearly all follow infection about the region of the cribriform.

Dr. Julius Grinker said that most of the cases of longitudinal sinus thrombosis have been diagnosed in the same way as that of Dr. Boot—that is, postmortem.

Dr. Boot, in closing, and replying to Dr. Robertson, said that the changes in the brain, the softening and the hemorrhages, pointed to the thing being an antemortem affair—not a postmortem clot.

The Speech Aspects of a Case of Cleft Palate.

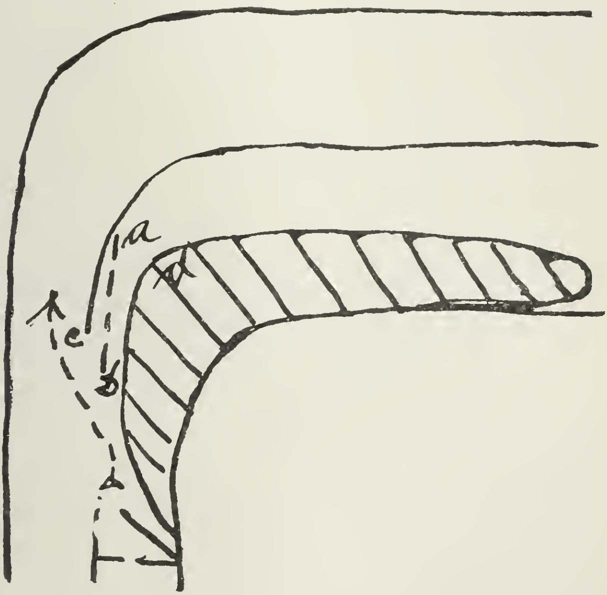
Dr. Elmer L. Kenyon presented a patient, Mr. E. T. B., a young man of twenty-four years, who represented the less complex speech problems of cleft palate. The lip cleft was closed in infancy, but repeated operations on the palate itself between five and seven years were unsuccessful. Not until two years ago was the palatal cleft closed, these later operations—but not the earlier ones—being done by Dr. T. W. Brophy, to whom the speaker was indebted for the patient. Originally, the palatal cleft did not extend backwards completely through the posterior border of the soft palate, but the partly intact soft palate was so short as to permit the tip of the tongue to be easily passed backwards and upwards into the nasopharynx. After closing the bony cleft the problem consisted in lengthening the soft palate. This was done by utilizing both palatopharyngei muscles and the left palatoglossus. The result was a long intact palate, flexible, and distant at the lower border about three-quarters of an inch from the posterior wall of the pharynx. The levator palati muscles take hold well on phonation, but so high above the lower border of the newly constructed part of the palate as to make the application of their power in raising the palate of little effect on the newly constructed lower part. But the power demanded for raising the lower part of the palate is much increased by the relative tightness of the lower border. Consequently, the distance of the newly made lower part of the palate to the posterior wall is not reduced on phonation.

The operative result attained was much more than one could possibly hope for, considering the shortness of the original palate, and its distance from the posterior wall. The point to be raised later concerning the result was raised not critically, but only in the hope of throwing a little additional light on the speech aspect of the surgical problem involved.

Commenting on the speech of the patient, it should first be remarked that a deflection of the nasal septum, together with chronic vasomotor enlargements of the lower turbinates, produced some rhinolalia clausa. The septum was therefore resected, without, however, disturbing the vasomotor swelling, which still continues and which will not be disturbed. The patient habitually talked rapidly and with a high pitch, largely in the head register, and with habitual lack of clearness. By persistent effort he now talks usually in the chest register and more slowly and distinctly; and certain minor imperfections of articulation have been corrected. But while the speech is markedly improved, the voice, of course, remains nasal, though less so than formerly. There is no hope of producing movement in the lower part of the soft palate, even with the massage being carried out, owing to the conditions previously mentioned.

The question the speaker wished to raise was in reference to the distance the soft palate had best be built downward in such cases, providing it be operatively possible to stop at any point desired. The downward extension of the palate should be such as not to discourage action of the levator palati muscles, and failing in securing such action, the palate should be only so low as should encourage, so far as possible, the outgoing vocal breath to take the oral route of exit rather than the nasal. This point should be determined with reference to the position of the posterior part of the tongue in the production of those vowels likely with an open palate to be most nasal, particularly as in boot. In these sounds the posterior part of the tongue raises to a median position in the mouth close to the immobile soft palate. If the lower border of the palate lies opposite the position of the arch of the posterior part of the tongue when the above sounds are produced, the air will be directed for the most part into the nose; whereas, if the lower border of the palate ends slightly above the center of this arch, the vocal breath can more readily pass into the mouth; a too low position of the palate tends, in other words, to produce a funnel-like connection of the laryngopharynx and the oropharynx behind the immobile palate, and a slightly higher position tends to discourage such a tendency. But if the palate as it descends tends quite sharply backwards, the increased length has no disadvantage of this kind.

The roughness of the anterior surface of this palate, due to the building of the new palate and to the remnants of tonsillar crypts which now enter into the new palatal structure. have a pathologic importance. Particles of food and infectious materials find their way easily into these irregularities, and the patient is, in fact, subject to infections in this region.



The speaker then drew a hypothetical case: If the palate in the accompanying illustration had stopped at a, the funneling into the nasopharynx would have been lessened and the levator palati muscles would take hold more effectively. The palate, a to c, would, however, have less tendency to funneling. Training should aim especially to reduce the distance, a to d, by causing the tongue to be habitually held lower on phonation.

Case of Injured Palate, With Stammering.

The second patient, E. M., a boy of ten years, presented certain questions having reference, on the one hand, to an injured soft palate, and, on the other, to difficulty in nasal breathing with consequent rhinolalia clausa, and also to stammering. There is no important history in the case until at six years of age he began to stammer. Shortly after this an operation was done on the throat, resulting, the mother states, in reducing the size of the tonsils. The mother says that two years later (that is, two years ago) the throat was operated again, this time for adenoids. She says that two unsuccessful operations were done without an anesthetic, and then a few days later a third one with general anesthesia. The stammering was not influenced by these operations. He is under treatment now in the Chicago public schools for his stammering, and his instructor, Miss Powers, who brings him to Dr. Kenyon, states that he is not responding well to training treatment. He breathes much of the time with his mouth open, and when the mouth is closed he has a nasopharyngeal or nasal noise, indicating obstruction, and is usually restless at night. The ears seem not to be involved at present. Examination shows the following: On each side the remnant of the tonsil and both anterior and posterior pillars appear to be adherent into one agglutinated mass. The palate is firmly bound down below, and the distance of the lower border to the posterior wall is not shortened on phonation, although the levator palati take hold well above. The uvula is absent; a heavy linear scar passes horizontally in the soft palate for an inch on the left side near the lower border, and the lower part of the palate seems drawn over towards the left side. The distance from the immobile lower part of the palate to the posterior wall of the pharynx is about one-half inch. When examined, rhinolalia aperta was absent. Finger examination of the nasopharynx shows adenoids to be present sufficient to interfere decidedly with breathing. The nose shows chronic vasomotor swelling of moderate degree.

The first question to be considered had reference to the obtaining of normal breathing by removal of the adenoids. If the adenoids were to be removed, the patient's voice would probably become markedly nasal, exactly as the voice of the operated cleft palate patient is nasal. The adenoids serve for voice purposes the part of the injured palate. The speaker, therefore, advised against operation for adenoids at this time, but should advise conservative nasal cauterization, which he hoped might do away with acuteness of the difficulty in breathing. If this failed, he should advise removal of small bits of the adenoids, working through the nose with a nasal adenoid forcep, guided by the finger in the nasopharynx. The possibility of operation on the soft palate to obtain movement in the lower part would be considered. If all of this worked out successfully, the patient would always be free from an open nasal voice; in any case, correct voice habits would have been thoroughly established before the nasaling had begun, and thus its effects mitigated.

Concerning the dependence of stammering upon the condition of the palate or the nasal occlusion: Stammering is dependent fundamentally on psychologic causes. Only where local conditions are capable of producing or increasing these mental disturbances can such local conditions affect the disorder. That adenoids may do so, he is convinced. That such an immobile palate might do so by interfering to a certain degree with the confidence of the patient in the handling of his voice is conceivable. But in view of the distinctly secondary influence of the adenoids and of the immobile palate on the stammering, and in view of the statements above with reference to rhinolalia aperta, the treatment of the stammering should be carried on with unusual care, without local operative measures upon the throat at this time.

DISCUSSION.

Dr. Charles M. Robertson said that a couple of years ago Dr. Beck showed a case of a lady patient in whom he had injected paraffin to build up the posterior wall, and he also had done that in a case. The speech in the first case exhibited by Dr. Kenyon could perhaps be improved considerably if the wall were built up, so that the palate could meet the lump made by the paraffin, especially in the U sounds, in which the palate should strike the pharyngeal wall. The only difficulty in introducing the paraffin is to get it to stick. Nearly all of the cases operated for cleft palate have an inelastic soft palate resulting. If the paraffin slips, you can wait a little while and do it over again, doing half the pharynx at a time, and using the paraffin cold. All you have to look out for is to keep it from going up too high into the nasopharynx.

In the second case, Dr. Robertson could not understand how Dr. Kenyon was going to improve the child's speech by leaving the adenoids. He thought Dr. Kenyon was counting too much on the adenoid as a foreign body, because it probably would disappear in a couple of years. The child was just about reaching his adolescent period, when the adenoid should atrophy.

Dr. Joseph C. Beck advised that there are better methods than paraffin in this work. Since using it in the patient referred to by Dr. Robertson, he had come to this conclusion. While improved temporarily, the paraffin sagged, and the nasal tone returned. He had operated on a second patient, and instead of using the muscles of the palatopharyngeus, the pillars, so to speak, he lengthened the palate, according to Gussenbauer's method, first described in 1886, by severing the soft palate from the hard, taking a thin ridge of palatal bone, making the incision transversely and then uniting longitudinally. Some tension incisions are necessary laterally. That is a far better method than the proposition shown here in the case presented.

Dr. Maclay asked how much was chiseled away.

Dr. Beck replied, just the edge to get support for the soft palate, so that it would not drop.

Dr. Robert Sonnenschein said that Eckstein, of Berlin, used paraffin in such cases as those reported. As a matter of fact, if the paraffin is used cold, as suggested by Dr. Robertson, you have to use a soft paraffin, which is liable to be displaced in the tissues, whereas if the hard paraffin of Eckstein were used, the substance would remain in situ.

Dr. Beck said that the paraffin he used was Eckstein's paraffin.

Dr. Kenyon, in answering Dr. Robertson, said that if the adenoids remained in the boy shown, the speech habits would be developed correctly, but if they were taken out speech would be incorrectly developed. He did not think of using paraffin, because by this method the speech would be made too excellent.

Herpes Zoster Oticus, With Facial Paralysis.

Dr. Joseph C. Beck showed a case which he had treated several years ago for peritonsillar abscess, which reappeared at various times. The patient developed a pain in the region of the forehead and along the ear, which kept him awake for several hours of the night, stopping exactly at four o'clock in the morning. Then he developed a slight attack of tonsillitis. The following day he had a similar condition of pain, at precisely the same hour, and stopping at the same hour. On examination, nothing was found about the throat; nothing wrong with the ear or teeth. Closer examination showed a little red spot in the floor of the auditory meatus, externally, which the speaker thought was due to a slight trauma. He told the patient to return the next day, but two or three hours later he called him over the phone and asked him to come and see him, that the water would run out of his mouth when he drank. As soon as Dr. Beck saw the patient he recognized that he had a complete facial paralysis. The next morning he had the beginning of a typical herpes zoster oticus. The next day the whole ear was swollen. This was supposed to be an inflammatory condition. The diagnosis is not at all difficult. One thing he wished the members would speak about in discussion was the etiology. The patient would always have a peritonsillar abscess when he had these symptoms of throat trouble, but with this attack he did not have the peritonsillar abscess. Was this peritonsillar abscess possibly an etiologic factor in most of the cases of facial paralysis of the idiopathic—although not stated? The prognosis in all reported cases has been excellent. This patient had also auditory nerve symptoms. He had slight dizziness, which persisted. The treatment consisted of galvanism and tonic treatment. The patient was recovering function and reacting very nicely to the treatment.

The next case was one of a young lady, who was referred to the speaker three weeks before by a doctor in Rochester, New York, with a history of having had a great number of nasal operations performed—the patient said twenty-five—for headache and profuse nasal discharge. This discharge is of a mucous character, with considerable fibrin pus. Culture shows pneumococci. In spite of treatment, it continued. The antrum was punctured, washed out, and a cast came through the antral opening, which was perfectly round in shape. There was no pus—just a fibrinous exudate. The principal symptom is intense headache. There is a drawing back of the head. Vaccines have not helped at all, and, in fact, no treatment seems to be of avail. Consultation with neurologists confirmed Dr. Beck in his opinion, but he would not say anything definite about that until he had had Dr. Grinker's opinion in discussion regarding the diagnosis. Personally, he could say nothing about the etiology of the case. The patient is unable to breathe through the nose, and cannot blow the nose—still there is a space between the palate and the posterior wall of the pharynx, and the nares are patent.

Dr. O. J. Stein inquired whether the discharge continued while the patient was asleep, to which Dr. Beck replied that it was less during sleep. Bromids did not seem to affect the headache at all. The X-ray picture of her sinuses showed them to be affected, either postoperative or by the process.

The next patient was one of typical Froehlich's syndrome of hypopituitarism, enlargement of the anterior lobe of the hypophysis. The patient had the cardinal symptoms of loss of the hair on the body, and excessive fat over the body. Sexual function was lost. There was complete blindness of the right eye, and half blindness or lateral hemianopsia in the left eye. There was no headache, and no pain. The case had been gone over thoroughly from every point, and the diagnosis was not difficult. The reason for showing the patient was to speak of the operation, which had been described by him on previous occasions, and performed quite a number of times on the cadaver. By this method the hypophysis was reached through the antrum, following the Jansen method of opening the sphenoid by way of the antrum, through the posterior ethmoid and sphenoid, which is very easy in the normal case, where infection is not present. The sella then can be reached very easily. (Demonstration of two heads in which this operation had been performed.) The patient shown was operated upon three weeks ago under scopolamin-morphin anesthesia. He was given a few whiffs of ether when chiseling into the bone. The operation was perfectly easy, and its principal advantage was the fact that the operator could see the structures he was going through. (Dr. Beck then showed illustrations of the different steps of the operation.) The X-ray in this case showed a very large sella turcica, and the stereoscopic picture was particularly valuable. The patient experienced very severe pain after the operation, of a neuralgic character, which necessitated keeping him under opiates. The enlargement of the gland was due to a cyst.

The point for consideration was: It was a cyst—will it recur? If so, there is a possibility of it causing pressure symptoms. The reason for operation was to conserve the little vision remaining.

Dr. Robertson asked if there was any pus present?

Dr. Beck answered that there was none—the case was normal in that respect.

The next patient, a young girl, was one of a family of otosclerotics. Her principal complaint was severe pain in the front of the head and along the neck, with gradual development of symptoms of left-sided paralysis of the larynx, tongue, palate and shoulder—that is, of the ninth, tenth, eleventh and twelfth nerves. Besides that, one portion of the trifacial was also affected. She gave a history of having had tubercular glands when very young. The X-ray showed a calcareous gland in the neck. There is also a spontaneous nystagmus to both sides, slightly rotary. The case was diagnosed by one neurologist as a multiple sclerosis. The speaker made a diagnosis of pressure on these nerves from this latent tuberculosis, which diagnosis was concurred in by another neurologist. Canfield, who saw the case, said it was an intracranial proposition. Operation was performed by the speaker, when he dissected the nerves, and surrounded them with Cargile membrane. She is recovering the function of the tongue and the atrophy is disappearing. The larynx is beginning to move. The pains have disappeared; she is able to move the shoulder again, and the palate is also markedly improving. It was a case of pressure on the nerves by an old calcareous tuberculosis, lit up by a fresh attack. Reaction to tuberculin was absolutely negative a number of times.

DISCUSSION.

Dr. Julius Grinker, by invitation, said, with reference to the case of herpes zoster, that the explanation of its causation by a peritonsillar abscess because it began in the same way as the peritonsillar abscess appeared to him somewhat far-fetched. Since Hunt's masterly description of this type of zoster we know of its existence as one kind of zoster, but not as having a specific etiology. To say that a patient develops an otitic zoster, although entitled to a peritonsillar abscess, would be equivalent to a belief in some sort of compensatory function of zoster—which is improbable.

Dr. Beck's second case, the girl with the profuse serous discharge from the nose, he believed to be one of hysteria. Instead of the mucous colitis of hysteria and neurasthenia—a well-known phenomenon—we have the unusual symptom of hysterical rhinorrhea.

Referring to the case with multiple nerve lesions, the relief obtained by Dr. Beck's operation of removal of glands in the immediate vicinity of the nerves, proves his diagnosis of pressure neuritis, and admonishes one always to search for some tangible and removable cause in peripheral neuritis, especially if confined to one side.

The case of hypophyseal disease of the Froehlich type was interesting from the diagnostic viewpoint, but more so because Dr. Beck had discovered a new route to the hypophyseal region. Though easily reached by Dr. Beck—being at home in those parts—he thought there was quite a distance to travel. This route in certain cases seemed to him preferable to the one followed by McArthur and Frazier, whose operation by comparison must be considered formidable and not devoid of the usual dangers accompanying cranial operations.

Dr. R. H. Brown, regarding the second case, asked as to whether, in examining the nose, there was any marked turgescence present: These hysteric cases remind one very much of cases of diabetes insipidus, where there is a perfect flood of blood to a certain part (which did not show locally on examination), and he was interested in knowing whether, in a part like the nose, which could be examined, this local congestion showed.

Dr. H. W. Loeb, of St. Louis, spoke about the case of paralysis, which he had had the opportunity to see before, during and after operation. Dr. Beck said that she had a nystagmus to both sides, but he had a distinct recollection that the nystagmus was to the opposite side. It was on that basis that Dr. Canfield thought that the case was intracranial, and for that reason the speaker agreed with him. Dr. Beck had insisted on the condition being one of pressure in that region, and the speaker simply rose to state that Dr. Beck's view was correct, and the rest of the men who saw the case were wrong.

Dr. Charles M. Robertson referred to the hyperpituitary case. If this had been a tumor of the hypophysis, the young man probably would not have had the happy result seen at the present time. Dr. Robertson had reported a case to the society two or three years ago—when Dr. Pierce had a case—upon whom he operated by this route. It is a very simple operation, and the only thing to contend with is the sphenomaxillary artery. Dr. Robertson's was a cyst case, and recurred after the pituitary body was relieved of the pressure, but the cyst came down into the nose and was removed with the dura until the healthy dura was found by section afterwards. The man is still well, showing that these cases do get well of cysts under the pituitary body. Cases of tumor he would pass on to the surgeon, but in cysts he thinks that they belong to the field of the laryngologist and otologist, and this method is the shortest, safest and easiest route to the pituitary.

Dr. Beck, in closing the discussion, wanted to take issue with Dr. Grinker. We do not have to have an abscess in order to have an infection.

Regarding the little girl, he showed her in order to have some of the members and guests express their opinions as to the question of hysteria. That was his diagnosis. The similarity between a mucous colitis or an excessive quantity of urine in a hysteric patient and the condition present in the young girl shown was the very point he had wished to have brought out.

Answering Dr. Brown's question, there was no turgescence present in this case. This brought him to a point made by Dr. Grinker as to the posterior lobe. He believes it is considered that diabetes insipidus is the symptom present when the posterior and middle lobes are involved, and that the anterior lobe involvement only produces the Froehlich syndrome.

Dr. Grinker said that involvement of the anterior lobe produces acromegaly.

Dr. Beck said Dr. Loeb was wrong in the point of unilateral nystagmus. The patient now has bilateral nystagmus. Canfield said it was intracranial because it was slightly rotary.

Regarding the young man, it was, of course, a case of either tumor or cyst—it made no difference. He would rather it had been a tumor, because a cyst has more likelihood of recurring than a tumor.

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